DEPARTMENT OF COMMERCE

# RADIO SERVICE BULLETIN

ISSUED MONTHLY BY RADIO DIVISION

Washington, January 31, 1928—No. 130

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## ABBREVIATIONS

The necessary corrections to the list of Commercial and Government Radio Stations of the United States and to the International List of Radiotelegraph Stations, appearing in this bulletin under the heading "Alterations and corrections," are published after the stations affected in the following order:

Name. =Name of station.
Loc. =Geographical location. O=west longitude. N=north latitude. S=south latitude.
Call =Call signal (letters) assigned.
System =Radio system used and sparks per second.
Range =Normal range in nautical miles.
W. l. =Wave lengths assigned: Normal wave lengths in italics.
Service =Nature of service maintained:
FX=Point-to-point (fixed service).
PG=General public.
PR=Limited public.
RC=Radio compass.
AB=Aviation beacon.
B=Beacon.
P=Private.
O=Government business exclusively.
Hours =Hours of operation:
N=Continuous service
X=No regular hours.
F. T. Co. =Federal Telegraph Co.
I. R. T. Co. =Intercity Radio Telegraph Co.
I. W. T. C. =Independent Wireless Telegraph Co.
K. & C. =Kilbourne & Clark Manufacturing Co.
M. R. T. Co. =Mackay Radio and Telegraph Co.
R. C. A. =Radio Corporation of America.

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R. M. C. A. =Radiomarine Corporation of America.
T. R. T. Co. =Tropical Radio Telegraph Co.
U. R. Corp. =Universal Radio Corp.
W. S. A. Co. =Wireless Specialty Apparatus Co.
C. w. =Continuous wave.
I. c. w. =Interrupted continuous wave.
Kc. =Kilocycles.
Fy. =Frequency.
A. c. =Alternating current.
V. t. =Vacuum tube.
U. S. L. =Applies only to the list of Commerical and Government Radio Stations of the United States.

## NEW STATIONS

### *Commercial land stations, alphabetically, by names of stations*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Station | Call signal | Wave lengths | Service | Hours | Station controlled by— |
|---|---|---|---|---|---|
| Catanauan, P.I. (Tayabas)[1] | KZKN | 550–1,100, 750 | PG | ------- | Philippine insular government. |

[1] Loc. 122° 19′ 30″ E., 13° 39′ 30″ N.; range, 120; system, U. S. Army v. t. telegraph; hours, 8 a. m., 12 noon, 2–5.30 p. m. daily; 9–11 a. m., Sundays and holidays, ship service last 10 minutes of each hour; rates, ship service, 6 cents per word.

### *Commercial ship stations, alphabetically, by names of vessels*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Name of vessel | Call signal | Rates | Service | Hours | Owner of vessel | Station controlled by— |
|---|---|---|---|---|---|---|
| Breeze | WQBQ | 8 | PG | X | Bay State Fishing Co. | R. M. C. A. |
| Galveston | KDQE | 8 | PG | X | U. S. S. B. | |
| Griffco | KDFN | 8 | PG | X | Inter Island Steam Navigation Co. | |
| Oldham | KDQG | 8 | PG | X | U. S. S. B. | |
| Potter | KDFC | 8 | PG | X | do | |
| Trinidad | WQBP | ----- | ------- | ------- | Panama Canal | Owner of vessel. |

### *Commercial land and ship stations, alphabetically, by call signals*

[b, ship station; c, land station]

| Call signal | Name of station | | Call signal | Name of station | |
|---|---|---|---|---|---|
| KDFC | Potter | b | KZKN | Catanauan, P. I. (Tayabas) | c |
| KDFN | Griffco | b | WQBP | Trinidad | b |
| KDQE | Galveston | b | WQBQ | Breeze | b |
| KDQG | Oldham | b | | | |

### *Commercial aircraft stations, alphabetically, by names of stations*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Station | Call signal | Wave length | Service | Hours | Station controlled by— |
|---|---|---|---|---|---|
| Registration No. NX3903 [1] | KDZ | 33.1 | P | X | George H. Wilkins, care Lockheed Aircraft Co., 1006 North Sycamore Avenue, Los Angeles, Calif. |
| Zenith Albatross (registration No. X3622).[2] | KHAD | 33.1 | P | X | Zenith Aircraft Corporation, Santa Ana, Calif. |

[1] Power, 50 watts; system, composite v. t. telegraph.
[2] Power, 15 watts; system, composite v. t. telegraph.

### *Commercial aircraft stations, alphabetically, by call signals*

| Call signal | Name of station | Call signal | Name of station |
|---|---|---|---|
| KDZ | NX3903. | KHAD | Zenith Albatross (registration No. X3622). |

### *Broadcasting stations, alphabetically, by names of States and cities*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927]

| State and city | Call signal | Wave length | Frequency (kilocycles) | Power (watts) |
|---|---|---|---|---|
| Mississippi: Gulfport | WQBO | 222.1 | 1,350 | 15 |

### *Broadcasting stations, alphabetically, by call signals*

| Call signal | Location of station (address) | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WQBO | Gulfport, Miss., 1319 Twenty-sixth Avenue. | Gulf Coast Music Co. | 15 | 222.1 | 1,350 |

### *Government land stations, alphabetically, by names of stations*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Station | Call signal | Wave length | Service | Hours | Station controlled by— |
|---|---|---|---|---|---|
| Dry Tortugas Light Station, Fla.[1] | WWER | 600, 706, 1000 | B | ---- | Bureau of Lighthouses. |
| Mobile, Ala | NCK | ---- | O | ---- | U. S. Coast Guard. |

[1] Loc. 82° 55′ 13″ W., 24° 37′ 59″ N.; system, Bureau of Lighthouses v. t. telegraph.

### *Government ship stations, alphabetically, by names of stations*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Station | Call signal | Wave length | Service | Hours | Station controlled by— |
|---|---|---|---|---|---|
| Mendota | NATM | | O | X | U. S. Navy. |
| Osprey | NIZF | | O | X | U. S. Coast Guard. |
| San Pablo | WYBC | 706 | O | X | U. S. Army. |

### *Government land and ship stations, alphabetically, by call signals*

[b, ship station; c, land station]

| Call signal | Name of station | Call signal | Name of station |
|---|---|---|---|
| NCK | Mobile, Ala.....c | WYBC | San Pablo.....b |
| NATM | Mendota.....b | WWER | Dry Tortugas Light Station, Fla.....c |
| NIZF | Osprey.....b | | |

## ALTERATIONS AND CORRECTIONS

### COMMERCIAL LAND STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne bureau]

EAST MORICHES, N. Y. (WSA).—Strike out all particulars.
ENSENADA, P. R.—Hours, N.
NEW LONDON, CONN.—Call signal changed to WSA.

### COMMERCIAL SHIP STATIONS, ALPHABETICALLY, BY NAMES OF VESSELS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

ASHBEE.—Name changed to Silverspruce.
ATHERO II.—Name changed to Caroline; owner of vessel, Eldridge R. Johnson.
CRESSIDA.—Station controlled by R. M. C. A.
EDITOR.—Correct call signal KOBG.
EL ABETO.—Owner of vessel, Coastwise S. S. & Barge Co.
EL CEDRO.—Owner of vessel, James Griffiths & Sons.
FOREST KING.—Owner of vessel, Traders Transport Co.
GUANTANAMO.—Name changed to Comeris; owner of vessel, New York & Porto Rico S. S. Co.
HAVANA.—Range, 150–300; system, Navy-W. S. A. Co. spark, 1,000 and I. W. T. Co. arc; service, PG; hours, N.; rates, 8 cents per word; station controlled by R. M. C. A.; owner of vessel, Atlantic, Gulf & West Indies S. S. Lines. Bulletin No. 128, November 30, 1927, incorrectly gave the orthography of the name as "Habana."
HUGUENOT.—Owner of vessel, Huguenot S. S. Corp.
MALIBU.—Owner of vessel, Mary K. Rindge; station controlled by R. M. C. A.
SAGAPORACK.—Owner of vessel, American Scantic Line.
SANTA CECILIA (WBB).—Owner of vessel, Nautilus S. S. Corp.
SAVARONA (KFZT).—Owner of vessel, Mrs. Richard M. Cadwalader, jr.
SAVARONA (WBBY).—Station controlled by R. M. C. A.
SEEKONK.—Owner of vessel, Seekonk Corporation.
SEVERANCE.—Owner of vessel, Diamond S. S. Transportation Corporation.
SILVERBROOK.—Correct orthography of name is "Silveroak"; owner of vessel, Clegg Ship Owning Corporation.
STEELVENDOR.—W. 1., *715*, 875; rates, Great Lakes service, 4 cents per word.
WEST ERRAL.—Name changed to Diamond Head.

WEST GOTOMSKA.—Station controlled by R. M. C. A. (U. S. L.).
WILLA CROSBY.—Name changed to Admiral Moser.
Strike out all particulars of the following-named vessels: Chillicothe, Shenango.

COMMERCIAL LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KERJ, *read* Diamond Head; KFZO, *read* Caroline; KIGZ, *read* Silverspruce; KOJG, *read* Silveroak; KWN, *read* Comeris; WDF, *read* Admiral Moser; WSA, *read* New London, Conn.; strike out all particulars following the call signals, KFAX, KTC, WST.

BROADCASTING STATIONS, BY CALL SIGNALS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927]

KFNF (Shenandoah, Iowa).—Power, 2,000 from 6 a. m. to 7 p. m.
KFUR (Farmington, Utah, near).—Changed to Ogden, Utah; power, 50.
KFWC (San Bernardino, Calif.).—Changed to Ontario, Calif., Valley Boulevard.
KFXJ (Denver, Colo.).—Power, 50.
KGBU (Ketchikan, Alaska).—W. l., 399.8, fy. kc., 750.
KGDX (Shreveport, La.).—Call signal changed to KWEA.
KGEH (Eugene, Oreg.).—Call signal changed to KIOS.
KGFP (Mitchell, S. Dak.).—Strike out all particulars.
KHJ (Los Angeles, Calif.).—W. l., 399.8, fy. kc., 750.
KLDS (Independence, Mo.).—Owner of station, Midland Broadcasting Co. and Reorganized Church of Jesus Christ of Latter Day Saints.
KMBS (Independence, Mo.).—Owner of station, Midland Broadcasting Co. and Reorganized Church of Jesus Christ of Latter Day Saints.
KNX (Los Angeles, Calif.).—Owner of station, Western Broadcast Co.
WAAF (Chicago, Ill.).—The word "portable" shown in Bulletin No. 128, November 30, 1927, in connection with a change in this station should have appeared on the followign line in back of Bethayres, Pa. (WALK), which is now permanently located at Willow Grove, Pa.
WFBM (Indianapolis, Ind.).—Changed to Perry Township, Ind.; power, 1,000.
WFBR (Baltimore, Md.).—Power, 250 night, 500 day.
WHBN (Gainesville, Fla.).—Call signal changed to WRUF; power, 5,000; w. l., 202.6, fy. kc., 1,480 (construction permit for change in power and w. l. issued November 21, 1927).
WHPP (New York, N. Y.).—Changed to Englewood Cliffs, N. J.
WIBW (Chicago, Ill., portable).—Changed to Topeka, Kans., Tenth and Kansas Streets; power, 250.
WLWL Kearney, N. J.—Power, 5,000.
WMBI (Chicago, Ill.).—Power, 2,500.
WNAX (Yankton, S. Dak.).—W. l., 302.8, fy. kc., 990.
WNBL (Bloomington, Ill.).—Strike out all particulars.
WPUB (New York, N. Y.).—Call signal changed to WMSG.
WRCV (Norfolk, Va.)—Call signal changed to WIVA.
WSOE (Milwaukee, Wis.).—Call signal changed to WISN.
WTAL (Toledo, Ohio).—Call signal changed to WSPD.

GOVERNMENT LAND STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radio telegraph Stations, published by the Berne Bureau]

BRYAN, OHIO.—Call signal changed to KRL.
CHEYENNE, WYO.—Call signal changed to KSG.
ELKO, NEV.—Call signal changed to KOJ.
IOWA CITY, IOWA.—Call signal changed to KIS.
MAYWOOD, ILL.—Call signal changed to KDA.
NORTH PLATTE, NEBR.—Call signal changed to KVM.
OMAHA, NEBR.—Call signal changed to KJF.
RENO, NEV.—Call signal changed to KLK.
ROCK SPRINGS, WYO.—Call signal changed to KDN.
SACRAMENTO, CALIF.—Call signal changed to KOC.
SAN FRANCISCO, CALIF. (KFZP).—Call signal changed to KEP.
Strike out all particulars of the following-named stations: Fort Casey, Wash., and Fort Whitman, Wash.

GOVERNMENT SHIP STATIONS, ALPHABETICALLY, BY NAMES OF STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations, published by the Berne Bureau]

McCALL.—Owner of vessel, U. S. Coast Guard.
SHAWMUT (NML).—Name changed to Oglala.
WENONAH.—Strike out all particulars.

GOVERNMENT LAND AND SHIP STATIONS, ALPHABETICALLY, BY CALL SIGNALS

KDEF changed to KJF, KDEG changed to KSG, KDEJ changed to KOJ, KDEK changed to KLK, KDEL changed to KRL, KDHM changed to KVM, KDHN changed to KDN, KDQA changed to KDA, KDQC changed to KOC, KFZP changed to KEP, KDTS changed to KIS, NJJ, NML, name changed to Oglala; WZC, strike out all particulars; WZJ, strike out all particulars.

SPECIAL LAND STATIONS, BY NAMES OF STATIONS

[Alterations and corrections to be made to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927]

AKRON, OHIO (8XAS).—W. l., 5.35–16.6 (56,000–18,100 kc.), 21.4–23.4 (14,000–12,825 kc.), 42.8–52.6 (7,005–5,700 kc.).
Strike out all particulars of the following-named stations: Bridgeport, Conn. (1XF); Cos Cob, Conn. (1XQ); New York, N. Y. (portable-2XBJ).

## MISCELLANEOUS

*Vessels equipped with a radio compass*

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

| Name | Call signal [1] | Owner |
|---|---|---|
| | | Commercial: |
| Ancon | KMS | Panama R. R. Co. |
| California | WRS | American Line S. S. Corporation. |
| Cambria | WPY | Bethlehem Transportation Corporation. |
| Cressida | WNBD | Herman Oelrichs. |
| Cristobal | KMD | Panama R. R. Co. |
| Daniel J. Morrell | KGBD | Cambria S. S. Co. |
| Edward Y. Townsend | KGBE | Do. |
| Emory L. Ford | KFKL | Franklin S. S. Corporation. |
| George G. Henry | WIT | Pan American Petroleum & Transport Co. |
| Grand Haven | | Grand Trunk & Milwaukee Car Ferry Co. |
| Iroquois | KFGD | New York & Miami S. S. Corporation. |
| Lackawanna | WLT | Bethlehem Transportation Corporation. |
| Lebanon | WLK | Do. |
| Lehigh | WLN | Do. |
| Milwaukee | | Grand Trunk & Milwaukee Car Ferry Co. |
| Nebraskan | WMV | American Hawaiian S. S. Co. |
| Nevadan | WLZ | Do. |
| Patricia | | Vincent Astor. |
| Shawnee | WOBG | New York & Miami S. S. Corporation. |
| S. T. Crapo | WOBA | Huron Transportation Co. |
| Steelton | WLX | Bethlehem Transportation Corporation. |
| McCall | NJW | Government: U. S. Coast Guard. |

[1] Vessels which do not have a call signal are not equipped with apparatus for communication.

CHANGES IN RADIOBEACON STATIONS OF THE UNITED STATES

[Additions to the list of Commercial and Government Radio Stations of the United States, edition of June 30, 1927, and to the International List of Radiotelegraph Stations published by the Berne bureau]

*Stratford Shoal (Middle Ground) Light Station, N. Y.*—W. l. changed to 1,034 meters (290 kilocycles).
*Fire Island Lightship, N. Y.*—W. l. changed to 1,017 meters (295 kilocycles).
*Sea Girt Light Station, N. J.*—W. l. changed to 1,034 meters (290 kilocycles).
*Five Fathom Bank Lightship, N. J.*—W. l. changed to 1,034 meters (290 kilocycles).

*Jupiter Inlet Light Station, Fla.*—Beacon established. Transmits every 180 seconds, groups of 1 dot and 3 dashes for 60 seconds, silent 120 seconds, thus:

| · — — — · — — — etc. | Silent. |
|---|---|
| 60 seconds. | 120 seconds. |

Beacon is operated on 1,034 meters (290 kilocycles) continuously during thick or foggy weather and daily in clear weather from 9 to 9.30 a. m. and p. m., seventy-fifth meridian time. Location: 80° 04′ 56″ W., 26°y56′ 54″ N. Radio communication service is not maintained.

*Dry Tortugas Light Station, Fla.*—Beacon established. Transmits every 180 seconds, groups of 3 dashes for 60 seconds, silent 120 seconds, thus:

| — — — — — — etc. | Silent. |
|---|---|
| 60 seconds. | 120 seconds. |

Beacon is operated on 1,000 meters (300 kilocycles) continuously during thick or foggy weather and daily in clear weather from 2 to 2.30 and 8 to 8.30 a. m. and p. m., seventy-fifth meridian time. Location: 82° 55′ 13″ W., 24° 37′ 59″ N. Radio communication service is not maintained.

### CHARACTERISTIC OF SAMBRO LIGHT VESSEL (NOVA SCOTIA) RADIOBEACON CHANGED AND SUBMARINE OSCILLATOR ESTABLISHED

The beacon has been changed to transmit 1 dot and 2 dashes for 1 minute, silent 1½ minutes. A submarine oscillator which sounds four groups of 5 dashes, each dash 1 second long, with 4 seconds between dashes and 9 seconds between groups and a 39-second interval at the end of each four groups, has been established on the vessel.

Ships equipped with radio and submarine signal receivers will be able to determine their distance from the lightship by noting the difference in time between the reception of the first dot of the radiobeacon and the first dash of the oscillator. This difference in time, in seconds, multiplied by 1,600, will give, approximately, the distance in yards of the ship from the lightship. Location (approximately): 63° 25′ 50″ W., 44° 21′ 48″ N.

### RADIO-COMPASS SERVICE ESTABLISHED AT INDIAN STATIONS

The station at Bombay (VWB) now maintains an experimental compass service in addition to its regular service. The procedure for obtaining a bearing is as follows: The ship calls the station when within range, and, on receiving an acknowledgement, will transmit either a series of the letter V (. . . —), or a repetition of her own call signal, for a period of 3 minutes, after good and reliable observations have been taken or the ship's position has been accurately fixed by shore bearings.

The compass station will then send the true bearing as observed on the direction finder. The ship will reply with her correct true bearing observed as above, in order that the compass station can effect any necessary adjustments to the station's instruments. Watch is maintained for the compass service between 1,430 and 2,230, G. M. T.

Masters of vessels are requested to communicate with the station with a view to checking the bearings observed at the compass station by means of positions determined by the ordinary methods. The service is to be regarded for the present as experimental, and as many comparisons as possible are required. No charge will be made for the transmission or receipt of bearings until further notice. Correspondence concerning the results obtained should be addressed to the Assistant Divisional Engineer, Wireless Station, Santa Cruz, Bombay, India.

The compass station formerly at Karachi has been moved to 67° 09′ 56″ E., 24° 52′ 44″ N., and is now available for service, on 600 meters, spark, and 1,550 meters, c. w. The compass station works in conjunction with Karachi (VWK), which replies to requests for bearings on the above-cited wave lengths. As a temporary arrangement, bearings will be transmitted free of charge to ships and aircraft. The Government of India will accept no liability for any consequences directly resulting from any inaccuracy in the bearings given, from any failure in the service, or from any cause whatever.

An experimental compass station has been established in 88° 11′ 51″ E., 22° 10′ 41″ N., Hooghly River, Bay of Bengal, at Diamond Harbor, about 25

miles southward of Calcutta. This station works in conjunction with the Calcutta station (VWC), and the procedure for obtaining a bearing is similar to that used for the compass station at Karachi. Bearings will be furnished free of charge. Call signal, VWC; wave length, 600 meters.

### COMPASS SERVICE ESTABLISHED FOR VESSELS APPROACHING DAIREN KO, KWANTUNG PENINSULA, CHINA

The following radio-compass stations have been established for the use of vessels approaching Dairen Ko: A control station, call signal JGDB, wave length 600 meters for receiving, 800 meters for transmitting (i. c. w.), range 170 miles, at Round Island Light Station; location 122° 09′ 30″ E., 38° 40′ 27″ N. A receiving station, call signal JGEB, range 170 miles, on the top of the railway company's wharf building at Dairen; location, 121° 39′ 00″ E., 38° 55′ 45″ N.

The following procedure has been prescribed for vessels desiring radio-compass bearings: The wave length employed for determining the bearing is 800 meters. In the event a ship can not transmit on that wave she will be permitted to use 600 meters, specifying in the preliminary signals that she intends to use that wave. The ship calls the control station in the usual manner on the 600-meter wave, making QTE (what is my true bearing?), in conjunction, if necessary, with a number indicating the wave length to be used for taking bearing. The control station acknowledges the signal, and when ready signal "K." The ship proceeds to transmit her call signal for 50 seconds, prolonging the dashes a little. The control station will then reply, making QTE (your true bearing from —— is — degrees), expressing in degrees (0 to 360), indicating the true bearing of the ship from the station concerned and also the local standard time (0000 to 2400, commencing at midnight) at which the observation was taken. On receiving the result the ship will repeat the message to the control station, which will acknowledge it, or repeat, if necessary, and when satisfied that the ship has received it correctly will signal "OK" or "R."

A single bearing from the receiving station at Darien can be obtained by calling the control station in the usual manner on 600 meters, making QTE in conjunction with the call signal of the station required and following the procedure outlined above. No charge is made for bearings.

Mariners obtaining bearings are requested to forward a brief report to the Lighthouse Board, Yokohama, Japan, containing the following particulars: Name of vessel, date and local standard time at which radio bearing was taken, estimated position of ship at the above time by methods other than radio, the probable degree of accuracy of the estimated position, weather conditions at the time, remarks, if any.—(*Notice to Mariners 2686, Department of Communications, Tokyo, 1927.*)

### LUNDY ISLAND (ENGLAND) RADIOBEACON DISCONTINUED

The experimental radiobeacon at North Lighthouse, Lundy Island, Bristol Channel, has been discontinued. It is intended to establish a permanent beacon at this lighthouse, but several months will elapse before the signal is in operation.

### NAVIGATIONAL WARNINGS TRANSMITTED BY PUERTO LIMON (COSTA RICA) STATION

In view of the difficulty experienced by vessels in sighting Puerto Limon in heavy weather, especially early in the morning, this station has been instructed to send signals to all vessels approaching, commencing at 11.30, G. M. T.

If at any time ships anticipate bad weather in entering the port and desire signals to be sent earlier than 11.30, they should communicate with the station and position signals will be transmitted at an earlier hour. Call signal UX, location 83° 03′ W., 10° 00′ N.

### GENERAL CALL SIGNAL ASSIGNED TO MACKAY RADIO & TELEGRAPH CO.

Call signal KGMM has been assigned to the Mackay Radio & Telegraph Co. as a gneral call signal for all vessels operated by that company. Notice published in Radio Service Bulletin No. 128, November 30, 1927, incorrectly gave KGGM as the signal.

### OPERATORS' LICENSE SUSPENDED

The department has suspended for a period of 30 days operators' licenses No. 16302, first class, third grade, issued August 24, 1926, at New York, and No. 986, first class, issued June 8, 1927, issued at New York, as the holders thereof violated article 6 of the International Convention service regulations (London, 1912) and section 5, paragraph D, subparagraph D, of the radio act of 1927, in that they transmitted superfluous signals by carrying on an unofficial conversation, thereby causing serious interference to the operation of other stations.

### APPLICANT BARRED FROM EXAMINATION FOR RADIO OPERATOR

An applicant was barred for a period of six months from taking an examination for radio operator, as he had taken an examination within a period of three months after having failed in a previous examination.

### INTERNATIONAL RADIOTELEGRAPH CONVENTION AND GENERAL AND SUPPLEMENTARY REGULATIONS RELATING THERETO

The text of the proceedings of the International Radiotelegraph Convention and the General Regulations adopted by and signed at the International Radiotelegraph Conference held in Washington from October 4 to November 25, 1927, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 40 cents per copy. The title "International Radiotelegraph Convention, and General and Supplementary Regulations Relating Thereto" (S. Doc., 70th Cong.) should be mentioned when forwarding remittances.

The convention and its regulations were transmitted on December 12, 1927, to the United States Senate by the President for advice and consent to their ratification. Up to the present time no definite action has been taken by the Senate.

### INDEPENDENT WIRELESS TELEGRAPH CO. PURCHASED BY THE RADIO CORPORATION OF AMERICA

The fixed assets, good will, and business of the Independent Wireless Telegraph Co. have been purchased by the Radio Corporation of America as of January 1, 1928, and the coastal station services, ship station services, and marine business of both companies will in future be conducted by a new R. C. A. subsidiary, known as the Radiomarine Corporation of America, 66 Broad Street, New York, N. Y.

The International List of Radiotelegraph Stations (Berne List) should be changed to show Radiomarine Corporation of America in lieu of Independent Wireless Telegraph Co. or Radio Corporation of America, in as far as the settlement of message accounts or concerned.

The list of "Commercial and Government Radio Stations of the United States" should be changed accordingly; that is, under the subheading "Station controlled by," R. M. C. A. (Radiomarine Corporation of America) should be shown in lieu of I. W. T. Co. or R. C. A.

### AMENDED REGULATIONS GOVERNING THE ISSUANCE OF RADIO OPERATORS' LICENSES

1. *Commercial extra first class.*—To be eligible for examination an applicant for this class of license must have held a commercial first-class license and must have been actually engaged as an operator at stations open to public correspondence for at least 18 months during the two years previous to his application. A speed in transmission and reception of at least 30 words per minute, Continental Morse Code, and 25 words per minute, American Morse Code, five characters to the word, must be attained.

The questions in this examination will be considerably wider in scope than those used for commercial first-class licenses. A percentage of at least 80 will constitute a passing mark.

Holders of licenses of this class are authorized to operate any licensed radio station.

2. *Commercial first class.*—Applicants for this class of license must pass a code test in transmission and reception at a speed of at least 20 words per minute in Continental Morse Code (five characters to the word).

The practical and theoretical examination shall consist of comprehensive questions under the following headings:

(*a*) Experience.
(*b*) Diagram of receiving and transmitting apparatus.
(*c*) Transmitting apparatus.
(*d*) Receiving apparatus.
(*e*) Operation and care of storage batteries.
(*f*) Motors and generators.
(*g*) International regulations governing radio communication and the United States Radio Laws and Regulations.

A percentage of 75 will constitute a passing mark for this class of license.

Holders of this class of license are authorized to operate any licensed radio station.

3. *Commercial second class.*—Applicants for this class of license must pass a code test in transmission and reception at a speed of at least 12 words per minute in Continental Morse Code (five characters to the word).

The practical and theoretical examination will cover the same subjects as required for the first-class license. A percentage of 65 will constitute a passing mark.

Holders of this class of license are authorized to operate only licensed radio stations not open to general public correspondence. This fact should be indicated by having all licenses of this class bear across their face, preferably in red, the following restriction: "This license not valid for the operation of any general public service station."

Applicants desiring to operate broadcasting stations only will be given an examination pertaining specifically to broadcasting apparatus. The licenses so issued will indicate this limitation by showing across their face, preferably in red, the following restriction: "This license valid only for the operation of a broadcasting station."

4. *Operator permits.*—In special cases where no interference with communications of other stations is involved, consideration will be given to applications for the operation of particular stations, without technical examination.

5. *Amateur license.*—Applicants for this grade of license must pass a code test in transmission and reception at a speed of at least 10 words per minute in Continental Morse Code (five characters to the word).

An applicant must pass an examination which will develop knowledge of the adjustment and operation of the apparatus which he desires to use and of the international regulations and acts of Congress in so far as they relate to interference with other radio communications and impose duties on all classes of operators. A percentage of 70 will constitute a passing mark. This license is valid for the operation of licensed amateur radio stations only.

6. *Temporary amateur license.*—Amateurs who can not be examined at time of application may be given temporary licenses valid for the operation of a particular station until such time as examination for a regular license can be held, but not to exceed a period of one year.

7. *Renewals.*—(*a*) Commercial extra first class: These licenses may be renewed without examination, provided the record shows 12 months' satisfactory service in a land or ship station open to general public service, at least 6 months of which must have been during the last 12 months of the license period. Holders of these licenses employed as radio inspectors, radio instructors, or in similar occupations requiring exceptional qualifications where the duties require the testing, or demonstrating, or otherwise using commercial radio apparatus and the telegraph codes may be issued renewals of their licenses without examination, provided such employment has covered a period of 18 months out of the two-year license period. Where the applicant has not regularly used the telegraph codes he will be given the code examination as for an original license, and if he has used only one code, he will be examined in the code not used.

(*b*) Other renewals: Renewal licenses may be issued to operators of other classes without examination, provided the operator has had three months' satisfactory service during the last six months of the license term. One year satisfactory service out of two years of the license term may be accepted for renewal at the discretion of the examining officer.

(*c*) Holders of commercial first-class radio operator licenses who have not had sufficient service at commercial stations to permit the unconditional renewal of such licenses, but indicate satisfactory service at broadcasting stations for the

length of time necessary for renewal and are unable to pass the required code test or to present themselves for a code test, may be issued restricted renewals of their existing licenses. The licenses so issued should bear across their face, preferably in red, the following restriction: "This license not valid for the operation of any limited or general public service station."

Holders of commercial second-class radio operator licenses who have passed the regular commercial second-class examination but have not had sufficient service at stations regularly using the Continental Code to permit unconditional renewal of such licenses, but indicate satisfactory service at broadcasting stations for the length of time necessary for renewal but are unable to pass the required code test or to present themselves for a code test may be issued restricted renewals of their existing licenses. The licenses so issued should bear across their face, preferably in red, the following restriction: "This license not valid for the operation of any limited or general public service station."

Applicants holding restricted commercial operators' licenses or broadcast operators' licenses may be issued renewals of such licenses provided the service records indicate three months' satisfactory service during the last six months of the license term. One year satisfactory service out of the two-year term of the license may be accepted at the discretion of the examining officer. Renewal commercial-class licenses so issued shall bear the indorsement "This license not valid for the operation of any limited or general public station," and renewal broadcast licenses should bear the indorsement "Valid only for the operation of a broadcasting station."

Applicants who have passed the regular commercial examination, but who hold renewal licenses indorsed "This license is not valid for the operation of any limited or general public service station," may be issued unconditional renewals of such licenses, provided they have the required service as indicated above and pass the code test required by the regulations for the class of license held by them.

(*d*) Renewals or new licenses may be issued a reasonable length of time previous to the expiration of existing licenses, but must bear the exact date of issue, which must correspond with the date on the back of Form 756 forwarded to the radio division.

Operators who fail to apply for renewal of their licenses on or prior to the date of expiration must be reexamined. If, because of circumstances over which the applicant has no control, an operator is unable to apply for nenewal of license on or prior to the date of expiration, an affidavit may be submitted to the radio division through the supervisor of radio or examining officer, attesting to the facts, which will be considered by the radio division, which will advise the supervisor of radio or examining officer in regard to the issue of a renewal of the license without reexamination.

Service records must be completed and signed only by masters, employers, or the duly authorized agents of either.

Any improper alteration of the service record or the forgery of masters' or employers' signature constitutes a violation of the regulations, and the operator may suffer suspension of license for a period not exceeding one year, at the discretion of the Secretary of Commerce.

8. *Reexamination.*—No applicant who fails to qualify will be reexamined within three months from date of the previous examination. All examination papers, except amateur, whether the applicant qualifies or not, will be forwarded to the Department of Commerce, Radio Division, for filing.

### REGULATIONS GOVERNING THE LICENSING AND OPERATION OF AMATEUR STATIONS

The Federal Radio Commission has established the following regulations governing the licensing and operation of amateur radio stations:

Amateur radio stations are authorized for communication only with similarly licensed stations and on wave lengths or frequencies within the following bands:

| Kilocycles: | Meters: |
|---|---|
| 401,000 to 400,000. | 0.7477 to 0.7496. |
| 64,000 to 56,000. | 4.69 to 5.35. |
| 16,000 to 14,000. | 18.7 to 21.4. |
| 8,000 to 7,000. | 37.5 to 42.8. |
| 4,000 to 3,500. | 75 to 85.7. |
| 2,000 to 1,500. | 150 to 200. |

and at all times unless interference is caused with other radio services, in which event a silent period must be observed between the hours of 8 and 10.30 p. m., local time, and on Sundays during local church services.

Amateur radio telephone operation will be permitted only in the following bands:

| Kilocycles: | Meters: |
|---|---|
| 64,000 to 56,000. | 4.69 to 5.35. |
| 14,500 to 14,000. | 20.68 to 21.4. |
| 2,000 to 1,580. | 150 to 190. |

Spark transmitters will not be authorized for amateur use.

Amateur stations must use circuits loosely coupled to the radiating system or devices that will produce equivalent effects to minimize key impacts, harmonics, and plate supply modulations. Conductive coupling, even though loose, will not be permitted, but this restriction shall not apply against the employment of transmission line feeder systems to Hertzian antennæ.

Amateur stations are not permitted to communicate with commercial or Government stations unless authorized by the licensing authority except in an emergency or for testing purposes. This restriction does not apply to communication with small pleasure craft such as yachts and motor boats holding limited commercial station licenses which may have difficulty in establishing communication with commercial or Government stations.

Amateur stations are not authorized to broadcast news, music, lectures, sermons, or any other form of entertainment.

No person shall operate an amateur station except under and in accordance with an operator's license issued to him by the Secretary of Commerce.

### TRANSMITTING SCHEDULES OF WASHINGTON (ARLINGTON) NAVAL STATION CHANGED

The transmitting schedules of Washington (Arlington (NAA)), exclusive of radiotelephone broadcast on 434.5 meters, 690 kc., are as follows:

8.15 a. m.—Special aviation weather on 74.7 meters, 4,015 kc.; 37.4 meters, 8,030 kc.; 24.9 meters, 12,045 kc.

10 a. m.—Marine weather—Major bulletin on 2,677 meters, 112 kc., and 18.6 meters, 16,060 kc., followed by ice reports (in season) on 2,677 meters, 112 kc.

11 a. m.—Angot message on 24.9 meters, 12,045 kc.

11.55 a. m.—Time on 2,677 meters, 112 kc.; 74.7 meters, 4,015 kc.; 37.4 meters, 8,030 kc.; 24.9 meters, 12,045 kc.

12 (noon).—Navigational warnings on 2,677 meters, 112 kc.

8.15 p. m.—Special aviation weather on 74.7 meters, 4,015 kc.

9.55 p. m.—Time on 2,677 meters, 112 kc.; 74.7 meters, 4,015 kc.; 37.4 meters, 8,030 kc.; 24.9 meters, 12,045 kc.

10 p. m.—Marine weather—Major bulletin, followed by ice reports (in season) and navigational warnings on 8,328 meters, 36 kc. (this wave length is discontinued at 11 p. m.), and 2,677 meters, 112 kc.

11 p. m.—Angot message on 74.7 meters, 4,015 kc.

All times given are eastern standard. Time, weather, and navigational warnings are sent on a. c. w.

### TIME SIGNALS BY MOGDISHU (MOGADISCIO), ITALIAN SOMALILAND STATION

Time signals are now transmitted by this station daily at 0900 G. M. T., corresponding to 1200 standard time. Preliminary signals are transmitted at 0852 and 0858.

## LIST OF MASTER CONTROL AND ALTERNATE CONTROL STATIONS OF THE NAVAL COMMUNICATION RESERVE

The stations named below have been assigned naval call signals to date, as follows:

| Naval district | Call signal | Location | Amateur call signal where authorized |
|---|---|---|---|
| First | NRRA | Wellesley, Mass | 1BTR |
| Third | NRRC | District headquarters, New York, N. Y | |
| Fourth | NRRD | Darby, Pa | 3BTU |
| Fifth | NRRE | Naval operating base, Hampton Roads, Va | |
| Fifth [1] | NRRK | Richmond, Va | 3ANM |
| Seventh | NRRG | Winter Park, Fla | 4NKF |
| Seventh [1] | NRRQ | Jacksonville, Fla | 4RA |
| Ninth | NRRL | Madison, Wis | 9XH |
| Ninth [1] | NRRZ | Minnetka, Ill | 9ZN |
| Twelfth | NRRB | Oakland, Calif | 6ND |

[1] Alternate.

## INTERNATIONAL ICE-PATROL SERVICE

The Coast Guard cutters *Modoc* and *Mojave* have been detailed for the season of 1928 to carry on the international ice-observation and ice-patrol service provided for by the international convention for the safety of life at sea at London in 1913 and 1914.

The object of the ice-patrol service is to locate the icebergs and field ice nearest to the trans-Atlantic steamship lane. It will be the duty of the patrol vessels to determine the southerly, easterly, and westerly limits of the ice and to keep in touch with these fields as they move to the southward in order that radio messages may be sent out daily giving the whereabouts of the ice, particularly the ice that may be in the immediate vicinity of the regular trans-Atlantic steamship lanes.

During the months of March, April, May, and June, and as much longer as necessary, these two vessels will base on Halifax, Nova Scotia. The patrol will be continuous, and the vessel on patrol will not leave her station until relieved by the other vessel unless it is absolutely necessary to do so.

Having located the ice, the vessel on patrol will transmit four daily radio broadcasts, giving ice information, for the benefit of shipping, each broadcast being repeated three times with an interval of two minutes between each repeat. Each broadcast will be preceded by the general call QST on 600 meters (500 kilocycles) wave length, immediately followed by the ice broadcast on the wave length specified, as follows:

| Time | | Wave length | Frequency |
|---|---|---|---|
| G. C. T. | Seventy-fifth meridian | | |
| | | *Meters* | *Kilocycles* |
| 0000 | 1900 | 1,713 | 175 |
| 1100 | 0600 | 706 | 425 |
| 1200 | 0700 | 1,713 | 175 |
| 2300 | 1800 | 706 | 425 |

Ice information will be given by radio at any time to any ship with which the patrol vessel can communicate. Such information will be furnished as regular radio traffic (without charge) on commercial traffic frequencies (wave lengths).

Ice-information broadcasts will be given in as plain, concise English as practicable and will state in the following order: (*a*) Position of patrol vessel, (*b*) location and description of ice, (*c*) other data.

The ice-patrol vessels' general radio call letters are NIDK. This is a special call for the vessel actually on patrol and should not be confused with the regular radio call letters assigned to the individual vessels.

The work of the United States Coast Guard cutters engaged on this ice-patrol duty will be greatly facilitated if the principal trans-Atlantic steamships report the following data by radio to the patrol vessels:

(*a*) Icebergs or obstructions sighted, giving date, time (G. C. T.), latitude, longitude, set, and drift; and in case it is an iceberg the temperature of the water at the time should be included.

(*b*) Surface temperature of the sea water every four hours when between latitude 39° N. and 48° N. and between longitude 43° W. and 58° W. when bound either east or west and giving time of observation (G. C. T.), the latitude and longitude, course, and speed.

These data will facilitate the drawing of a temperature curve which will be useful in locating the branches of the Labrador current.

It is requested that radio operators desist, as far as practicable, from operating at the above times in order to lessen radio interference.

### VESSELS CLEARING CHILEAN PORTS REQUIRED TO BE EQUIPPED WITH RADIO TRANSMITTERS

Beginning January 25, 1928, mechanically propelled vessels of more than 500 tons and sailing vessels of over 1,000 tons (both Chilean and foreign) will not be permitted to clear from ports of the Republic unless equipped with a radiotelegraph installation permitting communication during the day at sea in an effective manner, covering a distance of 200 nautical miles and without having on board a personnel capable of operating said installation.

### LIST OF BRITISH STATIONS TRANSMITTING NAVIGATIONAL WARNINGS

Radio navigational warnings, containing information relating to derelicts, temporary extinction of lights or displacement of principal aids to navigation, drifting mines, and other important hydrographic matter, are transmitted to shipping. Full particulars are given in the undermentioned schedule.

*Schedule*

| Station | Call signal | Position (latitude, longitude) | Time (G. M. T.) | Wave (meters) | Additional details |
|---|---|---|---|---|---|
| Niton | GNI | 50 35 N.<br>1 17 W. | | 600 | Does not broadcast but advises ships approaching or leaving the port of Southampton. |
| Land's End | GLD | 50 07 N.<br>5 40 W. | 0200, 0800,<br>1400, 2000 | 600 | Broadcasts to shipping in the English Channel and Bay of Biscay. |
| Fishguard | GRL | 52 01 N.<br>4 59 W. | 0218, 0818,<br>1418, 2018 | 600 | Broadcasts to shipping approaching or leaving St. Georges and Bristol Channels. |
| Seaforth | GLV | 53 28 N.<br>3 01 W. | | 600 | Does not broadcast but advises ships approaching the port of Liverpool of dangers within the area bounded by Northwest Mark (Formby Point)—Northwest Lightboat—Hilbre Islet. Vessels leaving the River Mersey and requiring such warnings by wireless can obtain them on request of this station at the usual coast station charges for inquiry and reply. |
| Port Patrick | GPK | 54 51 N.<br>5 07 W. | 0218, 0818,<br>1418, 2018 | 600 | Broadcasts to shipping in the North Channel and Firth of Clyde. |
| Wick | GKR | 58 26 N.<br>3 06 W. | 0200, 0800,<br>1400, 2000 | 600 | Broadcasts to shipping in the North Sea, and to shipping approaching or leaving the Pentland Firth. |
| Cullercoats | GCC | 55 02 N.<br>1 26 W. | 0218, 0818,<br>1418, 2018 | 600 | Broadcasts to shipping in the North Sea. |
| Humber | GKZ | 53 20 N.<br>0 17 E. | | 600 | Does not broadcast but advises ships approaching or leaving the Humber. |
| North Foreland | GNF | 51 22 N.<br>1 27 E. | 0200, 0800,<br>1400, 2000 | 600 | Broadcasts to shipping in the English Channel and North Sea. Information re wrecks in River Thames above Southend will only be broadcast immediately after the casualty and at each scheduled hour of broadcast for the following 24 hours, after which no further transmission will be made. |
| Valencia | GCK | 51 56 N.<br>10 21 W. | 0218, 0818,<br>1418, 2018 | 600 | Broadcasts to shipping in the Atlantic. |
| Malin Head | GMH | 55 22 N.<br>7 20 W. | 0200, 0800,<br>1400, 2000 | 600 | Do. |

All warnings are preceded by the radio danger call — — — (TTT), repeated at short intervals 10 times on full power; the warning is broadcast one minute later. The warnings are first of all broadcast immediately upon receipt by the station concerned and then at the above-mentioned times.

A repetition of any warning can be obtained by request to the station concerned at the usual coast station charge for inquiry and reply. Operators should, however, make every effort to get the warning at the scheduled hours of transmission.

Warnings relating to lights on light buoys, etc., will not be broadcast at 0800 or 0818 throughout the year or at 1400 and 1418 duirng May 13 to August 6. Warnings will be broadcast at the scheduled hours as long as may be necessary, but the cancellation of a previous warning will not be broadcast except under special circumstances.—*Admiralty Notice to Mariners No. 9, London, January 2, 1928.*

*List of broadcasting stations, alphabetically by call signal*

| Call signal | Location of station [1] | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KDKA | East Pittsburgh, Pa | Westinghouse Electric & Manufacturing Co. | 50,000 | 315.6 | 950 |
| KDLR | Devils Lake, N. Dak | Radio Electric Co | 15 | 230.6 | 1,300 |
| KDYL | Salt Lake City, Utah, Ezra Thompson Building. | Intermountain Broadcasting Corporation. | 500 | 234.2 | 1,280 |
| KELW | Burbank, Calif., 3702 Magnolia Avenue. | Earl L. White | [2] 500<br>[1] 1,000 | 228.9 | 1,310 |
| KEX | Portland, Oreg | Western Broadcasting Co | 2,500 | 239.9 | 1,250 |
| KFAB | Lincoln, Nebr., Thirteenth and Q Streets. | Nebraska Buick Auto Co | 5,000 | 319.0 | 940 |
| KFAD | Phoenix, Ariz., 312 North Central Street. | Electrical Equipment Co | 500 | 272.6 | 1,100 |
| KFAU | Boise, Idaho | Boise High School (independent school district of Boise City). | [2] 2,000<br>[1] 4,000 | 285.5 | 1,050 |
| KFBB | Havre, Mont | F. A. Buttrey Co | 50 | 275.1 | 1,090 |
| KFBC | San Diego, Calif., 207 Electric Building. | Arthur W. Yale | 100 | 247.8 | 1,210 |
| KFBK | Sacramento, Calif., 607 K Street. | Kimball-Upson Co | 100 | 535.4 | 560 |
| KFBL | Everett, Wash., 2814 Rucker Avenue. | Leese Bros | 50 | 223.7 | 1,340 |
| KFBU | Laramie, Wyo., St. Matthews Cathedral. | Bishop N. S. Thomas | 500 | 483.6 | 620 |
| KFCB | Phoenix, Ariz., 311 North Central Avenue. | Nielsen Radio Supply Co | 125 | 243.8 | 1,230 |
| KFCR | Santa Barbara, Calif., 1200 Anacapa Street. | Santa Barbara Broadcasting Co | 50 | 211.1 | 1,420 |
| KFDM | Beaumont, Tex | Magnolia Petroleum Co | 500 | 483.6 | 620 |
| KFDX | Shreveport, La | First Baptist Church | 250 | 236.1 | 1,270 |
| KFDY | Brookings, S. Dak | South Dakota State College | 500 | 545.1 | 550 |
| KFDZ | Minneapolis, Minn, 2510 Thomas Avenue south. | Harry O. Iverson | 10 | 215.7 | 1,390 |
| KFEC | Portland, Oreg | Meier & Frank Co | 50 | 214.2 | 1,400 |
| KFEL | Denver, Colo., 233 East Colfax Street. | Eugene P. O'Fallon (Inc.) | 250 | 247.8 | 1,210 |
| KFEQ | St. Joseph, Mo | Scroggin & Co. Bank | 1,000 | 230.6 | 1,300 |
| KFEY | Kellogg, Idaho | Union High School | 10 | 232.4 | 1,290 |
| KFGQ | Boone, Iowa | Boone Biblical College | 10 | 209.7 | 1,430 |
| KFH | Wichita, Kans | Hotel Lassen | 500 | 245.8 | 1,220 |
| KFHA | Gunnison, Colo | Western State College of Colorado | 50 | 254.1 | 1,180 |
| KFHL | Oskaloosa, Iowa | Penn College | 10 | 212.6 | 1,400 |
| KFI | Los Angeles, Calif., Tenth and Hope Streets. | Earle C. Anthony (Inc.) | 5,000 | 468.5 | 640 |
| KFIF | Portland, Oreg | Benson Polytechnic Institute | 50 | 214.2 | 1,400 |
| KFIO | Spokane, Wash | North Central High School | 100 | 245.8 | 1,220 |
| KFIU | Juneau, Alaska | Alaska Electric Light & Power Co | 10 | 225.4 | 1,330 |
| KFIZ | Fond du Lac, Wis., 18 Forest Avenue. | Fond du Lac Commonwealth Reporter. | 100 | 267,7 | 1,120 |
| KFJB | Marshalltown, Iowa | Marshall Electric Co | [2] 100<br>[1] 250 | 247.8 | 1,210 |
| KFJF | Oklahoma, Okla | National Radio Manufacturing Co. | [2] 750<br>[1] 1,000 | 272.6 | 1,100 |
| KFJI | Astoria, Oreg | E. E. Marsh | 15 | 249.9 | 1,200 |
| KFJM | Grand Forks, N. Dak | University of North Dakota | 100 | 333.1 | 900 |

[1] The street shown is the post-office address of the owner and not necessarily the street location of the transmitter. In some cases the post-office address is in a city other than where the transmitter is located. Construction permits have been issued for removal of several stations, however, and new data pertaining thereto will not be published until new licenses have been issued.

[2] Night.

[1] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KFJR | Portland, Oreg., 95 Fifth Street. | Ashley C. Dixon & Son | 100 | 282.8 | 1,060 |
| KFJY | Fort Dodge, Iowa, 1004 Central Avenue. | Tunwall Radio Co | 100 | 232.4 | 1,290 |
| KFJZ | Fort Worth, Tex., 3219 Avenue L. | W. E. Branch | 50 | 249.9 | 1,200 |
| KFKA | Greeley, Colo | Colorado State Teachers College | 200 | 249.9 | 1,200 |
| KFKB | Milford, Kans | J. R. Brinkley, M. D | [2] 1,500<br>[3] 2,500 | 241.8 | 1,240 |
| KFKU | Lawrence, Kans | University of Kansas | 500 | 254.1 | 1,180 |
| KFKX | Chicago, Ill | Westinghouse Electric & Manufacturing Co. | 2,500 | 526. | 570 |
| KFKZ | Kirksville, Mo | Northeast Missouri State Teachers College. | 15 | 225.4 | 1,330 |
| KFLV | Rockford, Ill | Swedish Evangelical Mission Church. | 100 | 267.7 | 1,120 |
| KFLX | Galveston, Tex., 3327 Avenue P. | George R. Clough | 100 | 270.1 | 1,110 |
| KFMR | Sioux City, Iowa | Morningside College | 100 | 232.4 | 1,290 |
| KFMX | Northfield, Minn | Carleton College | 500 | 236.1 | 1,270 |
| KFNF | Shenandoah, Iowa | Henry Field Seed Co | [4] 2,000 | 461.3 | 650 |
| KFOA | Seattle, Wash., 1321 Second Avenue. | Rhodes Department Store | 1,000 | 447.5 | 670 |
| KFON | Long Beach, Calif., Jergens Trust Building. | Nichols & Warinner (Inc.) | 500 | 241.8 | 1,240 |
| KFOR | Lincoln, Nebr | Howard A. Shuman | 100 | 217.3 | 1,380 |
| KFOX | Omaha, Nebr | Technical High School (Board of Education). | 100 | 258.5 | 1,160 |
| KFOY | St. Paul, Minn., Fourth and Robert Streets. | Maurice G. Goldberg | 250 | 222.1 | 1,350 |
| KFPL | Dublin, Tex., 1105 Grafton Street. | C. C. Baxter | 15 | 275.1 | 1,090 |
| KFPM | Greenville, Tex | New Furniture Co | 15 | 230.6 | 1,300 |
| KFPR | Los Angeles, Calif | Los Angeles County Forestry Department. | 250 | 232.4 | 1,290 |
| KEPW | Carterville, Mo | Rev. L. W. Stewart (St. Johns Church, South). | 50 | 263.0 | 1,140 |
| KFPY | Spokane, Wash., Howard Street and Sprague Avenue. | Symons Investment Co | 250 | 245.8 | 1,220 |
| KFQA | St. Louis, Mo., 5539 Page Avenue. | The Principia | 50 | 234.2 | 1,280 |
| KFQB | Fort Worth, Tex., Westbrook Hotel. | Lone Star Broadcast Co | 1,000 | 333.1 | 900 |
| KFQD | Anchorage, Alaska | Anchorage Radio Club | 100 | 344.6 | 870 |
| KFQU | Alma (Holy City), Calif | W. E. Riker | 100 | 249.9 | 1,200 |
| KFQW | Seattle, Wash., 315 Seneca Street. | K F Q W (Inc.) | 100 | 217.3 | 1,380 |
| KFQZ | Hollywood, Calif | Taft Radio & Broadcasting Co | 100 | 232.4 | 1,290 |
| KFRC | San Francisco, Calif | Don Lee (Inc.) | 1,000 | 454.3 | 660 |
| KFRU | Columbia, Mo | Stephens College | 500 | 249.9 | 1,200 |
| KFSD | San Diego, Calif., 326 Broadway. | Airfan Radio Corporation | 500 | 440.9 | 680 |
| KFSG | Los Angeles, Calif., 1100 Glendale Boulevard. | Echo Park Evangelistic Association. | 500 | 275.1 | 1,090 |
| KFUL | Galveston, Tex., 2126 Market Street. | Thomas Goggan & Bros | 500 | 258.5 | 1,160 |
| KFUM | Colorado Springs, Colo., 114 West Del Norte Street. | W. D. Corley | 1,000 | 282.8 | 1,060 |
| KFUO | Clayton, Mo | Concordia Theological Seminary | [2] 1,000<br>[3] 1,500 | 545.1 | 550 |
| KFUP | Denver, Colo | Fitzsimons General Hospital | 100 | 227.1 | 1,320 |
| KFUR | Ogden, Utah | Peery Building Co | 50 | 225.4 | 1,330 |
| KFUS | Oakland, Calif., 1444 Havenscourt Boulevard. | Louis L. Sherman | 50 | 256.3 | 1,170 |
| KFUT | Salt Lake City, Utah | University of Utah | 50 | 249.9 | 1,200 |
| KFVD | San Pedro (Venice), Calif., 1825 South Pacific Avenue. | W. J. and C. I. McWhinnie | 250 | 208.2 | 1,440 |
| KFVG | Independence, Kans | First Methodist Episcopal Church | 50 | 225.4 | 1,330 |
| KFVI | Houston, Tex | Fifty-sixth Cavalry Brigade, Headquarters Troop. | 50 | 238.0 | 1,260 |
| KFVS | Cape Girardeau, Mo., 312 South Frederick Street. | Hirsch Battery & Radio Co | 50 | 223.7 | 1,340 |
| KFWB | Hollywood, Calif., 5842 Sunset Boulevard. | Warner Brothers Broadcasting Corporation. | 500 | 361.2 | 830 |
| KFWC | Ontario, Calif., Fifth and E Streets. | Lawrence E. Wall | 100 | 222.1 | 1,350 |
| KFWF | St. Louis, Mo., 4030 Lindell Boulevard. | St. Louis Truth Center | 250 | 214.2 | 1,400 |
| KFWI | San Francisco, Calif., 1400 Van Ness Avenue. | Radio Entertainments (Inc.) | 500 | 267.7 | 1,120 |

[2] Night. [3] Day. [4] 6 a. m. to 7 p. m.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KFWM | Oakland, Calif. | Oakland Educational Society | {[2] 500 / [3] 1,000} | 236.1 | 1,270 |
| KFWO | Avalon, Calif. | Lawrence Mott | 250 | 299.8 | 1,000 |
| KFXD | Jerome, Idaho | Service Radio Co | {[2] 15 / [3] 50} | 204.0 | 1,470 |
| KFXK | Denver, Colo., 209 Sixteenth Street. | Pikes Peak Broadcasting Co. | 250 | 282.8 | 1,060 |
| KFXJ | Edgewater, Colo. (near) | R. G. Howell (Olinger Gardens) | 50 | 215.7 | 1,390 |
| KFXR | Oklahoma, Okla., 1305 Pennsylvania Street. | Exchange Avenue Baptist Church | 50 | 223.7 | 1,340 |
| KFXY | Flagstaff, Ariz. | Miss Mary M. Costigan (Orpheum Theater). | 25 | 205.4 | 1,460 |
| KFYO | Breckenridge, Tex. | Kirksey Bros. Battery & Electric Co. | 15 | 211.1 | 1,420 |
| KFYR | Bismarck, N. Dak., 200 Fourth Street. | Hoskins-Meyer (Inc.) | {[2] 250 / [3] 500} | 249.9 | 1,200 |
| KGA | Spokane, Wash., 325 Rowan Avenue. | Northwest Radio Service Co. | 2,000 | 260.7 | 1,150 |
| KGAR | Tucson, Ariz., 80 South Stone Avenue. | Citizen Publishing Co. (Tucson Citizen). | 100 | 234.2 | 1,280 |
| KGBU | Ketchikan, Alaska | Alaska Radio & Service Co. | 500 | 399.8 | 750 |
| KGBX | St. Joseph, Mo., 1221 Frederick Avenue. | Foster-Hall Tire Co. | 100 | 288.3 | 1,040 |
| KGBY | Columbus, Nebr. | Thelen & Taddiken | 50 | 222.1 | 1,350 |
| KGBZ | York, Nebr., 715 Grant Avenue | Federal Live Stock Remedy Co. (George R. Miller). | 100 | 212.6 | 1,410 |
| KGCA | Decorah, Iowa | Charles W. Greenley | 10 | 247.8 | 1,210 |
| KGCB | Oklahoma, Okla., 108 West Thirteenth Street. | Wallace Radio Institute | 50 | 215.7 | 1,390 |
| KGCH | Wayne, Nebr. | Wayne Hospital (S. A. Lutgen) | 250 | 293.9 | 1,020 |
| KGCI | San Antonio, Tex., 409 South Flores Street. | Liberto Radio Sales | 100 | 220.4 | 1,360 |
| KGCL | Seattle, Wash., 1107 Second Avenue. | Louis Wasmer and Archie Taft | 50 | 230.6 | 1,300 |
| KGCN | Concordia, Kans. | Concordia Broadcasting Co. | 50 | 208.2 | 1,440 |
| KGCR | Brookings, S. Dak. | Cutler's Radio Broadcasting Service (Inc.) | 15 | 208.2 | 1,440 |
| KGCU | Mandan, N. Dak. | Mandan Radio Association | 100 | 239.9 | 1,250 |
| KGCX | Vida, Mont. | First State Bank of Vida | 10 | 243.8 | 1,230 |
| KGDA | Dell Rapids, S. Dak. | Home Auto Co. (J. R. Nelson) | 15 | 254.1 | 1,180 |
| KGDE | Barrett, Minn. | Jaren Drug Co. | 50 | 205.4 | 1,460 |
| KGDM | Stockton, Calif., 42 South California Street. | E. F. Peffer | 10 | 217.3 | 1,380 |
| KGDP | Pueblo, Colo., 2927 High Street | Boy Scouts of America, Pueblo, Council. | 10 | 223.7 | 1,340 |
| KGDR | San Antonio, Tex., 206 Laurel Heights Place. | Joe B. McShane | 15 | 206.8 | 1,450 |
| KGDW | Humboldt, Nebr. | Frank J. Rist Plainview hog and seed farm. | 100 | 293.9 | 1,020 |
| KGDY | Oldham, S. Dak. | J. Albert Loesch | 15 | 206.8 | 1,450 |
| KGEF | Los Angeles, Calif. | Trinity Methodist Church | 500 | 263.0 | 1,140 |
| KGEK | Yuma, Colo., 109 West Second Avenue. | Beehler Electrical Equipment Co. | 10 | 263.0 | 1,140 |
| KGEN | El Centro, Calif. | E. R. Irey and F. M. Bowles | 15 | 225.4 | 1,330 |
| KGEO | Grand Island, Nebr. | Hotel Yancey | 100 | 205.4 | 1,460 |
| KGEQ | Minneapolis, Minn., 920 Fifth Avenue North. | Fred W. Herrmann | 50 | 204.0 | 1,470 |
| KGER | Long Beach, Calif., 435 Pine Avenue. | C. Merwin Dobyns | 100 | 215.7 | 1,390 |
| KGES | Central City, Nebr., 1516 Twenty-third Street. | Central Radio Electric Co. | 10 | 204.0 | 1,470 |
| KGEW | Fort Morgan, Colo. | City of Fort Morgan | {[2] 100 / [3] 200} | 218.8 | 1,370 |
| KGEY | Denver, Colo., 1917 East Twenty-eighth Avenue. | J. W. Dietz | 15 | 201.2 | 1,490 |
| KGEZ | Kalispell, Mont. | Flathead Broadcasting Association | 100 | 293.9 | 1,020 |
| KGFB | Iowa City, Iowa, 205 East College Street. | Albert C. Dunkel | 10 | 223.7 | 1,340 |
| KGFF | Alva, Okla. | Earl E. Hampshire | 25 | 205.4 | 1,460 |
| KGFG | Oklahoma, Okla. | Full Gospel Church | 50 | 215.7 | 1,390 |
| KGFH | La Crescenta, Calif. | Frederick Robinson | 250 | 223.7 | 1,340 |
| KGFI | San Angelo, Tex. | M. L. Eaves, pastor First Presbyterian Church. | 15 | 220.4 | 1,360 |
| KGFJ | Los Angeles, Calif., 233 West Twenty-first Street. | Ben S. McGlashan | 100 | 208.2 | 1,440 |
| KGFK | Hallock, Minn. | Kittson County Enterprise | 50 | 223.7 | 1,340 |
| KGFL | Raton, N. Mex. | N. L. Cotter | 50 | 222.1 | 1,350 |

[2] Night [3] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KGFN | Aneta, N. Dak. | Haraldson and Thingstad | 15 | 199.9 | 1,500 |
| KGFO | Los Angeles, Calif. (portable), 2055 North Thirteenth Street, Terre Haute, Ind. | Brant Radio Power Co | 100 | 204.0 | 1,470 |
| KGFW | Ravenna, Nebr. | Otto F. Sothman | 10 | 296.9 | 1,010 |
| KGFX | Pierre, S. Dak., 510 Summit Avenue. | Dana McNeil | 200 | 254.1 | 1,180 |
| KGGF | Pioher, Okla. | Dr. D. L. Connell | 100 | 296.8 | 1,450 |
| KGGH | Cedar Grove, La. | Bates Radio & Electric Co | 50 | 212.6 | 1,410 |
| KGGM | Inglewood, Calif. (portable) | Jay Peters | 100 | 204.0 | 1,470 |
| KGHB | Honolulu, Hawaii | Radio Sales Co | 250 | 227.1 | 1,320 |
| KGHC | Slayton, Minn. | Hegsted Radio Co | 15 | 209.7 | 1,430 |
| KGHF | Pueblo, Colo. | Philip G. Lasky and J. H. Albert | 250 | 209.7 | 1,430 |
| KGHP | Hardin, Mont. | Hardin Post No. 8 American Legion. | 50 | 263.0 | 1,140 |
| KGO | Oakland, Calif., 5555 East Fourteenth Street. | General Electric Co | 5,000 | 384.4 | 780 |
| KGRC | San Antonio, Tex., 103 San Pedro Avenue. | Gene Roth & Co | 100 | 220.4 | 1,360 |
| KGRS | Amarillo, Tex., 108 East Eighth Street. | Gish Radio Service | [2] 250<br>[3] 500 | 243.8 | 1,230 |
| KGTT | San Francisco, Calif. | Glad Tidings Temple and Bible Institute. | 50 | 206.8 | 1,450 |
| KGU | Honolulu, Hawaii, 217 South King Street. | Marion A. Mulrony | 600 | 270.1 | 1,110 |
| KGW | Portland, Oreg., Sixth and Alder Streets. | Portland Morning Oregonian | 1,000 | 491.5 | 610 |
| KGY | Lacey, Wash. | St. Martins College | 50 | 243.8 | 1,230 |
| KHAC | Airplane, 6138 Fulton Street, San Francisco, Calif. | Flying Broadcasters (Inc.) | 50 | 204.0 | 1,470 |
| KHJ | Los Angeles, Calif., 100 North Broadway. | Don Lee (Inc.) | 500 | 416.4 | 720 |
| KHMC | Harlingen, Tex. | Harlingen Music Co | 100 | 236.1 | 1,270 |
| KHQ | Spokane, Wash., Davenport Hotel. | Louis Wasmer | 1,000 | 370.2 | 810 |
| KICK | Atlantic, Iowa | Atlantic Automobile Co | 100 | 322.4 | 930 |
| KIOS | Eugene, Oreg. | Eugene Broadcast Station | 50 | 201.2 | 1,490 |
| KJBS | San Francisco, Calif., 1360 Bush Street. | Julius Brunton & Sons Co | 50 | 220.4 | 1,360 |
| KJR | Seattle, Wash., 611 Terminal Sales Building. | Northwest Radio Service Co | 2,500 | 348.6 | 860 |
| KKP | Seattle, Wash. | City of Seattle, Harbor Department. | 15 | 265.3 | 1,130 |
| KLCN | Blytheville, Ark. | Daily Courier-News | 50 | 285.5 | 1,050 |
| KLDS | Independence, Mo. | Reorganized Church of Jesus Christ of Latter Day Saints. | 1,500 | 270.1 | 1,110 |
| KLIT | Portland, Oreg., 475 Twenty-first Street. | Lewis I. Thompson | 10 | 296.8 | 1,450 |
| KLS | Oakland, Calif., 2201 Telegraph Avenue. | Warner Bros. | 250 | 245.8 | 1,220 |
| KLX | Oakland, Calif., Thirteenth and Franklin Streets. | Oakland Tribune | 500 | 508.2 | 590 |
| KLZ | Denver, Colo., Seventeenth and Broadway. | Reynolds Radio Co | [2] 750<br>[3] 1,000 | 296.9 | 1,010 |
| KMA | Shenandoah, Iowa. | May Seed & Nursery Co | 1,000 | 394.5 | 760 |
| KMBC | Independence, Mo. | Midland Broadcasting Co. and Reorganized Church of Jesus Christ of Latter Day Saints. | 1,500 | 270.1 | 1,110 |
| KMED | Medford, Oreg., Sparta Building. | W. J. Virgin | 50 | 249.9 | 1,200 |
| KMIC | Inglewood, Calif., 219 North Market Street. | James R. Fouch | 250 | 223.7 | 1,340 |
| KMJ | Fresno, Calif. | Fresno Bee | 50 | 365.6 | 820 |
| KMMJ | Clay Center, Nebr. | M. M. Johnson Co | [2] 250<br>[3] 500 | 285.5 | 1,050 |
| KMO | Tacoma, Wash., Hotel Winthrop. | K M O (Inc.) | 250 | 254.1 | 1,180 |
| KMOX | Kirkwood, Mo., Hotel Mayfair. | Voice of St. Louis (Inc.) | 5,000 | 299.8 | 1,000 |
| KMTR | Los Angeles, Calif., 1025 North Highland Avenue | K M T R Radio Corporation | 500 | 526.0 | 570 |
| KNRC | Santa Monica, Calif., Municipal Auditorium. | Clarence B. Juneau | 500 | 374.8 | 800 |
| KNX | Los Angeles, Calif. | Western Broadcast Co | 500 | 336.9 | 890 |
| KOA | Denver, Colo., 1370 Krameria Street. | General Electric Co | [2] 2,500<br>[3] 5,000 | 325.9 | 920 |
| KOAC | Corvallis, Oreg. | Oregon State Agricultural College | 500 | 270.1 | 1,110 |
| KOB | State College, N. Mex. | New Mexico College of Agriculture and Mechanic Arts. | [2] 5,000<br>[3] 7,500 | 394.5 | 760 |

[2] Night. [3] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KOCH | Omaha, Nebr. | Omaha Central High School | 250 | 258.5 | 1,160 |
| KOCW | Chickasha, Okla., 1800 Eighteenth Street. | Oklahoma College for Women | 250 | 252.0 | 1,190 |
| KOIL | Council Bluffs, Iowa, 1124 South Sixth Street. | Mona Motor Oil Co. | 5,000 | 319.0 | 940 |
| KOIN | Sylvan, Oreg. | K O I N (Inc.) | 1,000 | 319.0 | 940 |
| KOMO | Seattle, Wash., Harbor Island. | Fisher's Blend Station (Inc.) | 1,000 | 305.9 | 980 |
| KOW | Denver, Colo., 1429 Champa Street. | The Olinger Corporation Broadcasting. | 250 | 247.8 | 1,210 |
| KPCB | Seattle, Wash., 505 Central Building. | Pacific Coast Biscuit Co. | 50 | 230.6 | 1,300 |
| KPJM | Prescott, Ariz., box 730. | Frank Wilburn | 15 | 214.2 | 1,400 |
| KPLA | Los Angeles, Calif., Commercial Exchange Building. | Pacific Development Radio Co. | 500 | 252.0 | 1,190 |
| KPNP | Muscatine, Iowa, 213 Chestnut Street. | Central Radio Co. | 100 | 211.1 | 1,420 |
| KPO | San Francisco, Calif., Fifth and Market Streets. | Hale Bros. and The Chronicle | 1,000 | 422.3 | 710 |
| KPPC | Pasadena, Calif. | Pasadena Presbyterian Church | 50 | 228.9 | 1,310 |
| KPRC | Houston, Tex. | Post Dispatch (Houston Printing Co.). | 500 | 293.9 | 1,020 |
| KPSN | Pasadena, Calif. | Pasadena Star News | 1,000 | 315.6 | 950 |
| KQV | Pittsburgh, Pa., 719 Liberty Avenue. | Doubleday-Hill Electric Co. | 500 | 270.1 | 1,110 |
| KQW | San Jose, Calif. | First Baptist Church | 500 | 296.9 | 1,010 |
| KRAC | Shreveport, La., 504 Wall Street. | Caddo Radio Club | 50 | 220.4 | 1,360 |
| KRE | Berkeley, Calif. | First Congregational Church | 100 | 256.3 | 1,170 |
| KRLD | Dallas, Tex., Adolphus Hotel. | K R L D (Inc.) | 500 | 461.3 | 650 |
| KRLO | Los Angeles, Calif., 218 North Larchmont Boulevard. | Freeman Lang and A. B. Scott | 250 | 215.7 | 1,390 |
| KRSC | Seattle, Wash., 1202 Fifth Avenue. | Radio Sales Corporation | 50 | 211.1 | 1,420 |
| KSAC | Manhattan, Kans. | Kansas State Agricultural College | 500 | 333.1 | 900 |
| KSBA | Shreveport, La., Youree Hotel. | W. G. Patterson | 1,000 | 267.7 | 1,120 |
| KSCJ | Sioux City, Iowa | Sioux City Journal (Perkins Bros. Co.). | [1] 500<br>[2] 1,000 | 243.8 | 1,230 |
| KSD | St. Louis, Mo. | St. Louis Post Dispatch (Pulitzer Publishing Co.). | 500 | 545.1 | 550 |
| KSEI | Pocatello, Idaho, 141 South Sixth Avenue. | K S E I Broadcasting Association | 250 | 333.1 | 900 |
| KSL | Salt Lake City, Utah, 47 W. S. Temple Street. | Radio Service Corporation of Utah. | 1,000 | 302.8 | 990 |
| KSMR | Santa Maria, Calif. | Santa Maria Valley R. R. Co. | 100 | 272.6 | 1,100 |
| KSO | Clarinda, Iowa | A. A. Berry Seed Co. | 500 | 227.1 | 1,320 |
| KSOO | Sioux Falls, S. Dak., Carpenter Hotel. | Sioux Falls Broadcast Association | [1] 250<br>[2] 500 | 209.7 | 1,430 |
| KTAB | Oakland, Calif., 1410 Tenth Avenue. | Associated Broadcasters | 500 | 280.2 | 1,070 |
| KTAP | San Antonio, Tex., 822 West Mulberry Street. | Robert B. Bridge | 20 | 228.9 | 1,310 |
| KTBI | Los Angeles, Calif., 536 South Hope Street. | Bible Institute of Los Angeles | 500 | 288.3 | 1,040 |
| KTBR | Portland, Oreg., 153 Sixteenth Street. | M. E. Brown | 50 | 282.8 | 1,060 |
| KTHS | Hot Springs, Ark. | Arlington Hotel Co. | 1,000 | 384.4 | 780 |
| KTNT | Muscatine, Iowa | Norman Baker | 2,000 | 256.3 | 1,170 |
| KTSA | San Antonio, Tex., Plaza Hotel. | Alamo Broadcast Co. | 2,000 | 265.3 | 1,130 |
| KTUE | Houston, Tex., 614 Fannin Street. | Uhalt Electric | 5 | 212.6 | 1,410 |
| KTW | Seattle, Wash., Seventh Avenue and Spring Street. | First Presbyterian Church | 1,000 | 394.5 | 760 |
| KUJ | Seattle, Wash., 20 North Tacoma Avenue, Tacoma, Wash. | Puget Sound Radio Broadcasting Co. | 10 | 199.9 | 1,500 |
| KUOA | Fayetteville, Ark. | University of Arkansas | 500 | 296.9 | 1,010 |
| KUOM | Missoula, Mont. | University of Montana | 500 | 461.3 | 650 |
| KUSD | Vermillion, S. Dak. | University of South Dakota | 250 | 483.6 | 620 |
| KUT | Austin, Tex. | University of Texas | 500 | 232.4 | 1,290 |
| KVI | Tacoma, Wash., 20 Tacoma Avenue. | Puget Sound Radio Broadcasting Co. | 50 | 234.2 | 1,280 |
| KVL | Seattle, Wash., Moore Hotel. | Arthur C. Dailey | 100 | 202.6 | 1,480 |
| KVOO | Bristow, Okla., Roland Hotel. | Southwestern Sales Corporation | 1,000 | 345.6 | 860 |
| KVOS | Bellingham, Wash., 1366 State Street. | L. Kessler | 50 | 209.7 | 1,430 |
| KWBS | Portland, Oreg., 226 East Forty-first Street. | Schaeffer Radio Co. | 15 | 199.9 | 1,500 |
| KWCR | Cedar Rapids, Iowa, 1444 Second Avenue East. | Harry F. Pear | 250 | 238.9 | 1,250 |

[2] Night. [1] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| KWEA | Shreveport, La., 1513 Laurel Street. | William E. Antony | 250 | 212.6 | 1,410 |
| KWG | Stockton, Calif., 902 Commercial & Savings Bank Building. | Portable Wireless Telephone Co. | 50 | 344.6 | 870 |
| KWJJ | Portland, Oreg. | Wilbur Jerman | 50 | 228.9 | 1,310 |
| KWK | St. Louis, Mo., 4965 Lindell Boulevard. | Greater St. Louis Broadcasting Corporation. | [1] 1,000<br>[2] 2,000 | 234.2 | 1,280 |
| KWKC | Kansas City, Mo., Thirty-ninth and Main Streets. | Wilson Duncan Broadcasting Co. | 100 | 222.1 | 1,350 |
| KWKH | Kennonwood, La., Spring and Fanning Streets. | W. K. Henderson Iron Works & Supply Co. | 1,000 | 394.5 | 760 |
| KWLC | Decorah, Iowa | Luther College (Norwegian Luther College). | 50 | 247.8 | 1,210 |
| KWSC | Pullman, Wash. | State College of Washington | 500 | 394.5 | 760 |
| KWTC | Santa Ana, Calif., 1101 North Ross Street. | Dr. John W. Hancock | 100 | 222.1 | 1,350 |
| KWUC | Le Mars, Iowa | Western Union College | 1,500 | 243.8 | 1,230 |
| KWWG | Brownsville, Tex. | Chamber of Commerce (city of Brownsville). | 500 | 277.6 | 1,080 |
| KXA | Seattle Wash., 1520 Westlake Avenue. | American Radio Telephone Co. | 500 | 348.6 | 860 |
| KXL | Portland, Oreg., 130 Sixth Street. | K X L Broadcasters | 50 | 220.4 | 1,360 |
| KXRO | Aberdeen, Wash., Finch Building, Heron and South Heron Streets. | K X R O (Inc.) | 50 | 227.1 | 1,320 |
| KYA | San Francisco, Calif., Clift Hotel. | Pacific Broadcasting Corporation | 500 | 309.1 | 970 |
| KYW | Chicago, Ill., 700 Braddock Avenue. | Westinghouse Electric & Manufacturing Co. | [1] 2,500<br>[6] 5,000 | 526.0 | 570 |
| KZIB | Manila, P. I., 20 Plaza Moraga. | I. Beck (Inc.) | 20 | 249.9 | 1,200 |
| KZKZ | Manila, P. I., 109 Plaza Moraga. | Electrical Supply Co. | 100 | 270.1 | 1,110 |
| KZM | Oakland, Calif., Hotel Oakland. | Preston D. Allen | 100 | 245.8 | 1,220 |
| KZRQ | Manila, P. I., Manila Hotel. | Far Eastern Radio (Inc.) | 500 | 399.8 | 750 |
| NAA | Arlington, Va. | U. S. Navy | 1,000 | 434.5 | 690 |
| WAAD | Cincinnati, Ohio | Ohio Mechanics Institute | 25 | 230.6 | 1,300 |
| WAAF | Chicago, Ill., 836 Exchange Avenue. | Drovers Journal Publishing Co. | 500 | 389.4 | 770 |
| WAAM | Newark, N. J., 1 Bond Street. | W A A M (Inc.) | 250 | 267.7 | 1,120 |
| WAAT | Jersey City, N. J., 91 Sip Avenue. | Bremer Broadcasting Corporation. | 300 | 245.8 | 1,220 |
| WAAW | Omaha, Nebr., Grain Exchange Building. | Omaha Grain Exchange | 500 | 440.9 | 680 |
| WABC | Richmond Hill, N. Y., 113 West Fifth-seventh Street, New York City. | Atlantic Broadcasting Corporation. | [2] 2,500<br>[3] 5,000 | 309.1 | 970 |
| WABF | Kingston, Pa. (Pringleboro) | Markle Broadcasting Corporation | 250 | 265.4 | 1,460 |
| WABI | Bangor, Me. | First Universalist Church | 100 | 389.4 | 770 |
| WABO | Rochester, N. Y. | Lake Avenue Baptist Church and Society. | [3] 250<br>[5] 500 | 254.1 | 1,180 |
| WABW | Wooster, Ohio | College of Wooster | 50 | 247.8 | 1,210 |
| WABY | Philadelphia, Pa., 930 South Eighth Street. | John Magaldi, jr. | 50 | 247.8 | 1,210 |
| WABZ | New Orleans, La. | Coliseum Place Baptist Church | 50 | 238.0 | 1,260 |
| WADC | Akron, Ohio | Allen Theater (Allen T. Simmons) | 1,000 | 238.0 | 1,260 |
| WAFD | Detroit, Mich., Charlotte Street and Woodward Avenue. | Albert B. Parfet Co. | 100 | 230.6 | 1,300 |
| WAGM | Royal Oak, Mich., 726 Kayser Street. | Robert L. Miller | 50 | 225.4 | 1,330 |
| WAIT | Taunton, Mass., 32 Weir Street. | A. H. Waite & Co. | 10 | 214.2 | 1,400 |
| WAIU | Columbus, Ohio | American Insurance Union | 5,000 | 282.8 | 1,060 |
| WAIZ | Appleton, Wis. | Irving Zuelke (Inc.) | 100 | 227.1 | 1,320 |
| WALK | Willow Grove, Pa. | Albert A. Walker | 50 | 201.2 | 1,490 |
| WAMD | Minneapolis, Minn., Hotel Radisson. | Radisson Radio Corporation and Stanley E. Hubbard. | 500 | 222.1 | 1,350 |
| WAPI | Auburn, Ala. | Alabama Polytechnic Institute | 1,000 | 340.7 | 880 |
| WASH | Grand Rapids, Mich. | Baxter Laundries (Inc.) | 250 | 256.3 | 1,170 |
| WATT | Boston, Mass. (portable), 39 Boylston Street. | Edison Electric Illuminating Co. of Boston. | 100 | 201.2 | 1,490 |
| WBAA | West Lafayette, Ind. | Purdue University | 500 | 272.6 | 1,100 |
| WBAK | Harrisburg, Pa. | Pennsylvania State Police | [7] 500 | 299.8 | 1,000 |
| WBAL | Glen Morris, Md. (near Baltimore, Md.). | Consolidated Gas, Electric Light & Power Co. | 5,000 | 285.5 | 1,050 |
| WBAO | Decatur, Ill. | James Millikin University | 100 | 267.7 | 1,120 |
| WBAP | Fort Worth, Tex., 400 West Seventh Street. | Carter Publications (Inc.) | 5,000 | 499.7 | 600 |
| WBAW | Nashville, Tenn., Eighth Avenue, South and Broad Streets. | Waldrum Drug Co. | 500 | 239.9 | 1,250 |

[1] Night. [2] Day. [3] 6 a. m. to 10 p. m. [6] After 10 p. m. [7] Day only.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WBAX | Wilkes-Barre, Pa., 66 Gildersleeve Street. | John H. Stenger, jr | 100 | 249.9 | 1,200 |
| WBBC | Brooklyn, N. Y., 2123 Troy Avenue. | Brooklyn Broadcasting Corporation. | 500 | 227.1 | 1,320 |
| WBBL | Richmond, Va | Grace Covenant Presbyterian Church. | 100 | 234.2 | 1,280 |
| WBBM | Glenview, Ill., 1554 Howard Street. | Atlass Investment Co | 5,000 | 389.4 | 770 |
| WBBP | Petoskey, Mich | Petoskey High School | 100 | 239.9 | 1,250 |
| WBBR | Rossville, N. Y., 124 Columbia Heights, Brooklyn, N. Y. | Peoples Pulpit Association | 1,000 | 256.3 | 1,170 |
| WBBW | Norfolk, Va | Ruffner Junior High School | 100 | 236.1 | 1,270 |
| WBBY | Charleston, S. C | Washington Light Infantry | 75 | 249.9 | 1,200 |
| WBBZ | Chicago, Ill. (portable), 36 South State Street. | C. L. Carrell | 100 | 204.0 | 1,470 |
| WBCN | Chicago, Ill., 728 West Sixty-fifth Street. | Great Lakes Broadcasting Co | 250 | 288.3 | 1,040 |
| WBES | Tacoma Park, Md | Bliss Electrical School | 100 | 265.3 | 1,130 |
| WBET | Boston, Mass., 324 Washington Street. | Boston Transcript Co | 500 | 288.3 | 1,040 |
| WBIS | Boston, Mass., 1 Winter Place | Shepard Stores | 500 | 461.3 | 650 |
| WBKN | Brooklyn, N. Y., 350 Stone Avenue. | Arthur Faske | 100 | 199.9 | 1,500 |
| WBMH | Detroit, Mich., 13214 East Jefferson Street. | Braun's Music House | 100 | 211.1 | 1,420 |
| WBMS | Union City, N J., 964 Bergenline Avenue. | WBMS Broadcasting Corporation | 100 | 199.9 | 1,500 |
| WBNY | New York, N. Y., 400 East One hundred and thirty-ninth Street. | Baruchrome Corporation | 500 | 236.1 | 1,270 |
| WBOQ | Richmond Hill, N. Y., 113 West Fifty-seventh Street, New York City. | Atlantic Broadcasting Corporation. | 500 | 309.1 | 970 |
| WBRC | Birmingham, Ala., 1913 Fifth Avenue. | Birmingham Broadcasting Co | 250 | 241.8 | 1,240 |
| WBRE | Wilkes-Barre, Pa., 16 North Main Street. | Louis G. Baltimore | 100 | 249.9 | 1,200 |
| WBRL | Tilton, N. H., 23 Summer Street. | Booth Radio Laboratories | 500 | 232.4 | 1,290 |
| WBRS | Cliffside, N. J., 434 Lafayette Street, Brooklyn, N. Y. | Italian Educational Broadcast Co | 250 | 211.1 | 1,420 |
| WBSO | Wellesley Hills, Mass., Babson Park, Mass. | Babson's Statistical Organization | 100 | 384.4 | 780 |
| WBT | Charlotte, N. C | C. C. Coddington | [1] 750<br>[2] 1,000 | 258.5 | 1,160 |
| WBZ | Springfield, Mass | Westinghouse Electric & Manufacturing Co. | 15,000 | 333.1 | 900 |
| WBZA | Boston, Mass., Hotel Statler | do | 500 | 333.1 | 900 |
| WCAC | Mansfield, Conn | Connecticut Agricultural College | 500 | 535.4 | 560 |
| WCAD | Canton, N. Y | St. Lawrence University | [1] 500<br>[2] 1,000 | 248.8 | 1,230 |
| WCAE | Pittsburgh, Pa., Sixth and Smithfield Streets. | Kaufmann & Baer Co | 500 | 461.3 | 650 |
| WCAH | Columbus, Ohio, 321 West Tenth Avenue. | Entrekin Electric Co | 250 | 234.2 | 1,280 |
| WCAJ | Lincoln, Nebr. (University Place). | Nebraska Wesleyan University | 500 | 379.5 | 790 |
| WCAL | Northfield, Minn | St. Olaf College | 500 | 285.5 | 1,050 |
| WCAM | Camden, N. J | City of Camden | 500 | 223.7 | 1,340 |
| WCAO | Baltimore, Md., 844 North Howard Street. | Monumental Radio (Inc.) | 250 | 243.8 | 1,230 |
| WCAP | Asbury Park, N. J., Isolation Hospital. | Radio Industries Broadcast Co | 500 | 239.9 | 1,250 |
| WCAT | Rapid City, S. Dak | South Dakota State School of Mines. | 100 | 247.8 | 1,210 |
| WCAU | Philadelphia, Pa., Hotel Pennsylvania. | Universal Broadcasting Co | 500 | 260.7 | 1,150 |
| WCAX | Burlington, Vt | University of Vermont | 100 | 254.1 | 1,180 |
| WCAZ | Carthage, Ill | Carthage College | 50 | 249.9 | 1,200 |
| WCBA | Allentown, Pa., 1015 Allen Street. | Charles W. Heimbach and E. Bryan Musselman. | 100 | 222.1 | 1,350 |
| WCBD | Zion, Ill | Wilbur G. Voliva | 5,000 | 344.6 | 870 |
| WCBE | New Orleans, La., Hotel De Soto. | Uhalt Radio | 5 | 227.1 | 1,320 |
| WCBM | Baltimore, Md., Charles Street and North Avenue. | Hotel Chateau | 100 | 225.4 | 1,330 |
| WCBR | Providence, R. I. (portable), 42 Doyle Avenue. | Charles H. Messter | 100 | 201.2 | 1,490 |

[1] Night. [2] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WCBS | Springfield, Ill., St. Nicholas Hotel. | Harold L. Dewing and Charles H. Messter. | 250 | 209.7 | 1,430 |
| WCCO | St. Paul-Minneapolis, Minn. (Anoka). | Washburn-Crosby Co. | [2] 5,000<br>[3] 7,500 | 405.2 | 740 |
| WCDA | Cliffside, N. J., (434 Lafayette Street, Brooklyn, N. Y. | Italian Educational Broadcast Co. | 250 | 211.1 | 1,420 |
| WCFL | Chicago, Ill., 623 South Wabash Avenue. | Chicago Federation of Labor | 1,500 | 483.6 | 620 |
| WCGU | Coney Island, N. Y. (Sea Gate), 183 Vermont Street. | Charles G. Unger | 500 | 218.8 | 1,370 |
| WCLO | Kenosha, Wis. | C. E. Whitmore | 100 | 227.1 | 1,320 |
| WCLS | Joliet, Ill., 301 East Jefferson Street. | The M. A. Felman Co. | 150 | 215.7 | 1,390 |
| WCMA | Culver, Ind. | Culver Military Academy | 500 | 260.7 | 1,150 |
| WCOA | Pensacola, Fla. | City of Pensacola | 500 | 249.9 | 1,200 |
| WCOC | Columbus, Miss., Fifth Street and Ninth Avenue South. | Crystal Oil Co. | 250 | 230.6 | 1,300 |
| WCOT | Providence, R. I., 1849 Westminster Street. | Jacob Conn | 100 | 225.4 | 1,330 |
| WCRW | Chicago, Ill., 2756 Pine Grove Avenue. | Clinton R. White | 500 | 223.7 | 1,340 |
| WCSH | Portland, Me. | Congress Square Hotel Co. | 500 | 365.6 | 820 |
| WCSO | Springfield, Ohio | Wittenberg College | 500 | 256.3 | 1,170 |
| WCWK | Fort Wayne, Ind., 1729 Lafayette Street. | Chester W. Keen | 250 | 214.2 | 1,400 |
| WCWS | Danbury, Conn., 198 Main Street. | Danbury Broadcasting Station | 100 | 265.3 | 1,130 |
| WCX | Pontiac, Mich. | WJR (Inc.) and the Detroit Free Press. | 5,000 | 440.9 | 680 |
| WDAD | Nashville, Tenn., 171 Eighth Avenue North. | Dad's Auto Accessories (Inc.) and Life and Casualty Insurance Co. | 1,000 | 225.4 | 1,330 |
| WDAE | Tampa, Fla. | Tampa Daily Times | 500 | 267.7 | 1,120 |
| WDAF | Kansas City, Mo. | Kansas City Star | 1,000 | 370.2 | 810 |
| WDAG | Amarillo, Tex., 605 East Fourth Street. | J. Laurance Martin | 250 | 263.0 | 1,140 |
| WDAH | El Paso, Tex. | Trinity Methodist Church, South | 100 | 234.2 | 1,280 |
| WDAY | Fargo, N. Dak., 119 Broadway | Radio Equipment Corporation | [2] 250<br>[3] 500 | 545.1 | 550 |
| WDBJ | Roanoke, Va., 106 Church Avenue Southwest. | Richardson-Wayland Electrical Corporation. | 250 | 230.6 | 1,300 |
| WDBO | Orlando, Fla., Winter Park, Fla. | Rollins College | [2] 500<br>[3] 1,000 | 268.3 | 1,040 |
| WDEL | Wilmington, Del., 405 Delaware Avenue. | Wilmington Electrical Specialty Co. | 100 | 296.9 | 1,010 |
| WDGY | Minneapolis, Minn., Superior Boulevard at Falvey Crossroad. | George W. Young | 500 | 285.5 | 1,050 |
| WDOD | Chattanooga, Tenn., 615 Market Street. | Chattanooga Radio Co. | 500 | 243.8 | 1,230 |
| WDRC | New Haven, Conn., 5 Beacon Avenue. | Doolittle Radio Corporation | 500 | 282.8 | 1,060 |
| WDWF | Cranston, R. I. | Dutee W. Flint and The Lincoln Studios. | 250 | 280.7 | 1,150 |
| WDZ | Tuscola, Ill., Star Store Building | James L. Bush | 100 | 277.6 | 1,080 |
| WEAF | New York, N. Y., 195 Broadway | National Broadcasting Co. | 5,000 | 491.5 | 610 |
| WEAM | North Plainfield, N. J. | Borough of North Plainfield | 250 | 263.0 | 1,140 |
| WEAN | Providence, R. I. | Shepard Co. | 500 | 275.1 | 1,090 |
| WEAO | Columbus, Ohio | Ohio State University | 750 | 282.8 | 1,060 |
| WEAR | Cleveland, Ohio | Willard Storage Battery Co. | 1,000 | 399.8 | 750 |
| WEBC | Superior, Wis., 1225 Tower Street. | Head of the Lakes Broadcasting Co. | [2] 250<br>[3] 1,000 | 241.8 | 1,240 |
| WEBE | Cambridge, Ohio, 319 Wall Street. | Roy W. Waller | 10 | 247.8 | 1,210 |
| WEBH | Chicago, Ill., 5525 Sheridan Road. | Edgewater Beach Hotel Co. | 500 | 365.6 | 820 |
| WEBJ | New York, N. Y., 2396 Third Avenue. | Third Avenue Ry. Co. | 500 | 256.3 | 1,170 |
| WEBQ | Harrisburg, Ill. | Tate Radio Co. | 15 | 223.7 | 1,340 |
| WEBR | Buffalo, N. Y., Bramson Building. | H. H. Howell Broadcasting Co. | 200 | 241.8 | 1,240 |
| WEBW | Beloit, Wis. | Beloit College | 500 | 258.5 | 1,160 |
| WEDC | Chicago, Ill., 3860 Ogden Avenue. | Emil Denemark | 500 | 241.8 | 1,240 |
| WEEI | Boston, Mass., 39 Boylston Street. | Edison Electric Illuminating Co. of Boston. | 500 | 508.2 | 590 |
| WEHS | Evanston, Ill., 1318 Elmwood Avenue. | Victor C. Carlson | 100 | 508.2 | 1,390 |
| WEMC | Berrien Springs, Mich. | Emmanuel Missionary College | 1,000 | 483.6 | 620 |

[2] Night. [3] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WENR | Chicago, Ill., 310 South Michigan Avenue. | Great Lakes Radio Broadcasting Co. | 500 | 288.3 | 1,040 |
| WEPS | Gloucester, Mass., 209 Main Street. | Matheson Radio Co. (Inc.) | 100 | 296.9 | 1,010 |
| WEVD | Woodhaven, N. Y., 9024 Seventy-eighth Street. | Debs Memorial Radio Fund | 500 | 245.8 | 1,220 |
| WEW | St. Louis, Mo. | St. Louis University | 1,000 | 352.7 | 850 |
| WFAA | Dallas, Tex. | Dallas Morning News | 500 | 545.1 | 550 |
| WFAM | St. Cloud, Minn. | Times Publishing Co. | 10 | 252.0 | 1,190 |
| WFAN | Philadelphia, Pa., Hotel Lorraine. | Keystone Broadcasting Co. (Haverford College Radio Club). | 500 | 223.7 | 1,340 |
| WFBC | Knoxville, Tenn. | First Baptist Chirch | 50 | 234.2 | 1,280 |
| WFBE | Cincinnati, Ohio. | Garfield Place Hotel | 250 | 245.8 | 1,220 |
| WFBG | Altoona, Pa. | William F. Gable Co. | 100 | 267.7 | 1,120 |
| WFBJ | Collegeville, Minn. | St. John's University | 100 | 272.6 | 1,100 |
| WFBL | Syracuse, N. Y., Jefferson and Warren Streets. | The Onondaga Co. | 750 | 258.5 | 1,160 |
| WFBM | Indianapolis, Ind., 48 Monument Circle. | Indianapolis Power & Light Co. | 1,000 | 275.1 | 1,090 |
| WFBR | Baltimore, Md., Hoffman and Bolton Streets. | Baltimore Radio Show (Inc.) | [2] 250 / [3] 500 | 243.8 | 1,230 |
| WFBZ | Galesburg, Ill. | Knox College | 50 | 247.8 | 1,210 |
| WFCI | Pawtucket, R. I., 103 Exchange Street. | Frank Crook (Inc.) | 100 | 241.8 | 1,240 |
| WFDF | Flint, Mich., Police Building. | Frank D. Fallain | 100 | 272.6 | 1,100 |
| WFI | Philadelphia, Pa. | Strawbridge & Clothier | 500 | 405.2 | 740 |
| WFIW | Hopkinsville, Ky. | Acme Mills (Inc.) | [2] 750 / [3] 1,000 | 260.7 | 1,150 |
| WFJC | Akron, Ohio. | W. F. Jones Broadcasting (Inc.) | 500 | 227.1 | 1,320 |
| WFKB | Chicago, Ill., 4536 Woodlawn Avenue. | Francis K. Bridgman (Inc.) | 500 | 228.7 | 1,340 |
| WFKD | Philadelphia, Pa., 1510 Oxford Street (Frankford). | Foulkrod Radio Engineering Co. | 50 | 247.8 | 1,210 |
| WFLA | Clearwater, Fla., South Osceola Street, City Park. | Clearwater Chamber of Commerce and St. Petersburg Chamber of Commerce. | 750 | 516.9 | 580 |
| WGAL | Lancaster, Pa., 23 East Orange Street. | Lancaster Electric Supply & Construction Co. | 15 | 252.0 | 1,190 |
| WGBB | Freeport, N. Y., 217 Bedell Street. | Harry H. Carman | 400 | 245.8 | 1,220 |
| WGBC | Memphis, Tenn. | First Baptist Church | 15 | 228.9 | 1,310 |
| WGBF | Evansville, Ind., 307 South Seventh Street. | Finke Furniture Co. | 250 | 236.1 | 1,270 |
| WGBI | Scranton, Pa., 318 Linden Street | Scranton Broadcasters, (Inc.) | 250 | 230.6 | 1,300 |
| WGBS | Astoria, N. Y., Thirty-third Street and Sixth Avenue, New York City. | Gimbel Bros. | 500 | 348.6 | 860 |
| WGCP | Newark, N. J., 591 Broad Street. | May Radio Broadcast Corporation. | 250 | 267.7 | 1,120 |
| WGES | Chicago, Ill., 128 North Crawford Avenue. | Oak Leaves Broadcasting Corporation. | 500 | 241.8 | 1,240 |
| WGHP | Mount Clemens, Mich., (2761 Jefferson Avenue, Detroit, Mich.). | George H. Phelps (Inc.) | 750 | 277.6 | 1,080 |
| WGL | Secaucus, N. J., Hotel Majestic. | International Broadcasting Corporation. | 1,000 | 293.9 | 1,020 |
| WGM | Jeannette, Pa., 501 Cowan Avenue. | Verne & Elton Spencer | 50 | 208.2 | 1,440 |
| WGMS [1] | St. Paul-Minneapolis, Minn. | Washburn-Crosby Co. | 500 | 245.8 | 1,220 |
| WGMU | Richmond Hill, N. Y. (portable) 113 West Fifty-seventh Street, New York City. | Atlantic Broadcasting Co. | 100 | 201.2 | 1,490 |
| WGN | Chicago, Ill., 435 North Michigan Avenue. | The Tribune Co. and Liberty Weekly (Inc.). | 500 | 416.4 | 720 |
| WGOP | Flushing, N. Y., 55 North Fifteenth Street. | Frederick B. Zittell, jr. | 100 | 199.9 | 1,500 |
| WGR | Buffalo, N. Y., Statler Hotel | Federal Radio Corporation | 750 | 302.8 | 990 |
| WGST | Atlanta, Ga. | Georgia School of Technology | 500 | 270.1 | 1,110 |
| WGWB | Milwaukee, Wis., 144 Broadway | Radiocast Corporation of Wis. | 500 | 218.8 | 1,370 |
| WGY | Schenectady, N. Y. | General Electric Co. | 50,000 | 379.5 | 790 |
| WHA | Madison, Wis. | University of Wisconsin | 750 | 333.1 | 900 |
| WHAD | Milwaukee, Wis. | Marquette University | 500 | 270.1 | 1,110 |
| WHAM | Victor Township, N. Y. | Stromberg-Carlson Telephone Manufacturing Co. | 5,000 | 280.2 | 1,070 |
| WHAP | Carlstadt, N. J., Washington Avenue. | Defenders of Truth Society (Inc.) | 1,000 | 236.1 | 1,270 |
| WHAS | Louisville, Ky. | Courier-Journal and Louisville Times. | 500 | 322.4 | 930 |

[2] Night. [3] Day.

[1] This call assigned for use of Washburn-Crosby Co. when transmitting through WLB.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WHAZ | Troy, N. Y. | Rensselaer Polytechnic Institute | 500 | 305.9 | 980 |
| WHB | Kansas City, Mo., Sweeney Building. | Sweeney School Co | 500 | 340.7 | 880 |
| WHBA | Oil City, Pa. | C. C. Shaffer | 10 | 260.7 | 1,150 |
| WHBC | Canton, Ohio. | St. John's Catholic Church | 10 | 236.1 | 1,270 |
| WHBD | Bellefontaine, Ohio. | Chamber of Commerce | 100 | 222.1 | 1,350 |
| WHBF | Rock Island, Ill., 217 Eighteenth Street. | Beardsley Specialty Co | 100 | 222.1 | 1,350 |
| WHBL | Chicago, Ill. (portable) 36 South State Street. | C. L. Carrell | 100 | 204.0 | 1,470 |
| WHBM | do | do | 100 | 201.2 | 1,490 |
| WHBP | Johnstown, Pa., 101 Main Street. | Johnstown Automobile Co | [2] 500 / [3] 250 | 228.9 | 1,310 |
| WHBQ | Memphis, Tenn., Dermon Building. | Broadcasting Station WHBQ (Inc.). | 100 | 232.4 | 1,290 |
| WHBU | Anderson, Ind. | Citizens Bank | 15 | 220.4 | 1,360 |
| WHBW | Philadelphia, Pa., 4916 Chestnut Street. | D. R. Kienzle | 100 | 220.4 | 1,360 |
| WHBY | West De Pere, Wis. | St. Norbert's College | 50 | 249.9 | 1,200 |
| WHDI | Minneapolis, Minn., 818 Superior Boulevard. | William Hood Dunwoody Industrial Institute. | 500 | 245.8 | 1,220 |
| WHEC | Rochester, N. Y., 36 South Avenue. | Hickson Electric Co | [2] 250 / [3] 500 | 254.1 | 1,180 |
| WHFC | Chicago, Ill., Hotel Flanders | Goodson & Wilson (Inc.) | 200 | 215.7 | 1,390 |
| WHK | Cleveland, Ohio, corner Ontario and St. Clair Avenues. | Radio Air Service Corporation | [2] 500 / [3] 1,000 | 265.3 | 1,130 |
| WHN | New York, N. Y., 1540 Broadway. | George Schubel | 500 | 394.5 | 760 |
| WHO | Des Moines, Iowa. | Bankers Life Co | 5,000 | 535.4 | 560 |
| WHPP | Englewood Cliffs, N. J., Sylvan and Hollywood Avenues. | Bronx Broadcasting Co | 10 | 206.8 | 1,450 |
| WHT | Deerfield, Ill. (410 North Michigan Boulevard, Chicago, Ill.). | Radiophone Broadcasting Corporation. | 5,000 | 305.9 | 980 |
| WIAD | Philadelphia, Pa., 6318 North Park Avenue. | Howard R. Miller | 100 | 288.3 | 1,040 |
| WIAS | Ottumwa, Iowa, 107 East Second Street. | Poling Electric Co | 100 | 322.4 | 930 |
| WIBA | Madison, Wis., 16 East Mifflin Street. | Capital Times Co. and Strand Theater Corporation. | 100 | 239.9 | 1,250 |
| WIBG | Elkins Park, Pa. | St. Paul's Protestant Episcopal Church. | 50 | 440.9 | 680 |
| WIBJ | Chicago, Ill. (portable), 36 South State Street. | C. L. Carrell | 100 | 201.2 | 1,490 |
| WIBM | do | do | 100 | 201.2 | 1,490 |
| WIBO | Desplaines, Ill. | WIBO Broadcasters (Inc.) | 5,000 | 305.9 | 980 |
| WIBR | Steubenville, Ohio. | Thurman A. Owings | 50 | 249.9 | 1,200 |
| WIBS | Elizabeth, N. J., 80 Broad Street. | New Jersey Broadcasting Corporation. | 250 | 204.0 | 1,470 |
| WIBU | Poynette, Wis. | Wisconsin State Journal | 20 | 217.3 | 1,380 |
| WIBW | Topeka, Kans., Tenth and Kansas Streets. | C. L. Carrell | 250 | 204.0 | 1,470 |
| WIBX | Utica, N. Y., 102 Lafayette Street. | WIBX (Inc.) | [2] 150 / [3] 300 | 238 | 1,260 |
| WIBZ | Montgomery, Ala., 217 Catoma Street. | Alexander D. Trum | 15 | 230.6 | 1,300 |
| WICC | Easton, Conn., Sport Hill | Bridgeport Broadcasting Station (Inc.). | 500 | 265.3 | 1,130 |
| WIL | St. Louis, Mo., 1010 Locust Street. | Benson Radio Broadcasting Co | 250 | 258.5 | 1,160 |
| WIOD | Miami Beach, Fla. | Carl G. Fisher Co | 1,000 | 247.8 | 1,210 |
| WIP | Philadelphia, Pa., Market and Ninth Streets. | Gimbel Bros | 500 | 348.6 | 860 |
| WISN | Milwaukee, Wis., 467 Jackson Street. | School of Engineering of Milwaukee. | 250 | 270.1 | 1,110 |
| WIVA | Norfolk, Va., 305 Plume Street. | Radio Corporation of Virginia | 100 | 209.7 | 1,430 |
| WJAD | Waco, Tex., Hotel Raleigh | Frank P. Jackson | 500 | 333.1 | 900 |
| WJAG | Norfolk, Nebr. | Norfolk Daily News | [2] 250 / [3] 500 | 285.5 | 1,050 |
| WJAK | Kokomo, Ind. | Kokomo Tribune | 50 | 234.2 | 1,280 |
| WJAM | Cedar Rapids, Iowa, 322 Third Avenue, West. | D. M. Perham | 250 | 239.9 | 1,250 |
| WJAR | Providence, R. I. | The Outlet Co | 500 | 483.6 | 620 |
| WJAS | Pittsburgh, Pa., Tenth and Penn Avenue. | Pittsburgh Radio Supply House | 500 | 270.1 | 1,110 |
| WJAX | Jacksonville, Fla. | City of Jacksonville | 1,000 | 340.7 | 880 |
| WJAY | Cleveland, Ohio, Hotel Hollenden. | Cleveland Radio Broadcasting Corporation. | 500 | 227.1 | 1,320 |
| WJAZ | Mount Prospect, Ill. (3620 Iron Street., Chicago, Ill.) | Zenith Radio Corporation | 5,000 | 263.0 | 1,140 |

[2] Night. [3] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WJBA | Joliet, Ill., 301 Whitley Avenue. | D. H. Lentz, jr | 50 | 247.8 | 1,210 |
| WJBB | Sarasota, Fla | Financial Journal | 250 | 238.0 | 1,260 |
| WJBC | La Salle, Ill., Second and Joliet Streets. | Hummer Furniture Co | 100 | 227.1 | 1,320 |
| WJBI | Red Bank, N. J., 63 Broad Street. | Robert S. Johnson | 250 | 263.0 | 1,14 |
| WJBK | Ypsilanti, Mich., 303 Congress Street. | Ernest F. Goodwin | 15 | 220.4 | 1,360 |
| WJBL | Decatur, Ill., 301 North Water Street. | William Gushard Dry Goods Co. | 250 | 212.6 | 1,410 |
| WJBO | New Orleans, La., 119 South St. Patrick Street. | Valdemar Jensen | 100 | 263.0 | 1,140 |
| WJBT | Chicago, Ill., 1554 Howard Street. | John S. Boyd (Inc.) | 500 | 389.4 | 770 |
| WJBU | Lewisburg, Pa | Bucknell University | 100 | 214.2 | 1,400 |
| WJBW | New Orleans, La., 2743 Dumaine Street. | Charles C. Carlson, jr | 30 | 238.0 | 1,260 |
| WJBY | Gadsden, Ala., 517 Broad Street. | Electric Construction Co | 50 | 234.2 | 1,280 |
| WJBZ | Chicago Heights, Ill., 1701 Halstead Street. | Roland G. Pamler and Anthony Coppotelli. | 100 | 208.2 | 1,440 |
| WJJD | Mooseheart, Ill | Supreme Lodge of the World, Loyal Order of Moose. | 1,000 | 365.6 | 820 |
| WJKS | Gary (Inc.), 540 Lake Street | Johnson Kennedy Radio Corporation. | 500 | 232.4 | 1,290 |
| WJPW | Ashtabula, Ohio, 192 Prospect Street. | J. P. Wilson | 30 | 208.2 | 1,440 |
| WJR | Pontiac, Mich | WJR (Inc.) and the Detroit Free Press. | 5,000 | 440.9 | 680 |
| WJZ | Bound Brook, N. J., 33 West Forty-second Street. | Radio Corporation of America | 30,000 | 454.3 | 660 |
| WKAQ | San Juan, P. R., Telephone Building. | Radio Corporation of Porto Rico | 500 | 322.4 | 930 |
| WKAR | East Lansing, Mich | Michigan State College | {[3] 500 / [4] 1,000} | 277.6 | 1,080 |
| WKAV | Laconia, N. H | Laconia Radio Club | 50 | 223.7 | 1,340 |
| WKBB | Joliet, Ill., 613 Jefferson Street | Sanders Bros | 150 | 215.7 | 1,390 |
| WKBC | Birmingham, Ala., 1428 North Twelfth Avenue. | H. L. Ansley | 10 | 218.8 | 1,370 |
| WKBE | Webster, Mass., 59 Emerald Avenue. | K. & B. Electric Co | 100 | 228.9 | 1,310 |
| WKBF | Indianapolis, Ind., 902 North Meridian Street. | Noble B. Watson | 250 | 252.0 | 1,190 |
| WKBG | Chicago, Ill. (portable), 36 South State Street. | C. L. Carrell | 100 | 201.2 | 1,490 |
| WKBH | La Crosse, Wis., 221 Main Street. | Callaway Music Co | 500 | 220.4 | 1,360 |
| WKBI | Chicago, Ill., 1917 Warner Avenue. | Fred L. Schoenwolf | 50 | 215.7 | 1,390 |
| WKBL | Monroe, Mich., 16 South Monroe Street. | Monrona Radio Manufacturing Co. | 15 | 205.4 | 1,460 |
| WKBN | Youngstown, Ohio (Young Men's Christian Association). | Radio Electric Service Co | 50 | 214.2 | 1,400 |
| WKBO | Jersey City, N. J., 2866 Boulevard. | Camith Corporation | 500 | 218.8 | 1,370 |
| WKBP | Battle Creek, Mich | Battle Creek Enquirer and News | 50 | 212.6 | 1,410 |
| WKBQ | New York, N. Y., 1100 East One hundred and seventy-seventh Street. | The Standard Cahill Co. (Inc.) | 500 | 218.8 | 1,370 |
| WKBS | Galesburg, Ill., 227 Duffield Avenue. | Permil N. Nelson | 100 | 217.3 | 1,380 |
| WKBT | New Orleans, La | First Baptist Church | 50 | 252.0 | 1,190 |
| WKBV | Brookville, Ind., 658 Main Street. | Knox Battery & Electric Co | 100 | 217.3 | 1,380 |
| WKBW | Buffalo, N. Y., 1428 Main Street | Churchill Evangelistic Association. | {[3] 500 / [4] 750} | 217.3 | 1,380 |
| WKBZ | Ludington, Mich., First National Bank Building. | Karl L. Ashbacker | 15 | 199.9 | 1,500 |
| WKEN | Amherst, N. Y | WKEN (Inc.) | 750 | 204.0 | 1,470 |
| WKDR | Kenosha, Wis., 936 North Michigan Avenue, Chicago, Ill. | Edward A. Dato | 15 | 247.8 | 1,210 |
| WKJC | Lancaster, Pa., 16 West King Street. | Kirk Johnson & Co | 50 | 252.0 | 1,190 |
| WKRC | Cincinnati, Ohio, Hotel Alms | Kodel Radio Corporation | 500 | 245.8 | 1,220 |
| WKY | Oklahoma, Okla., Huckins Hotel. | WKY Radiophone Co | 150 | 288.3 | 1,040 |

[3] Night. [4] Day

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WLAC | Nashville, Tenn. | Life and Casualty Insurance Co. and Dad's Auto Accessories (Inc.). | 1,000 | 225.4 | 1,330 |
| WLAP | Louisville, Ky. (Virginia Avenue Baptist Church). | L. W. Benedict | [2] 30 / [3] 100 | 267.7 | 1,120 |
| WLB | Minneapolis, Minn. | University of Minnesota | 500 | 245.8 | 1,220 |
| WLBC | Muncie, Ind., 2224 South Jefferson, Street. | D. A. Burton | 50 | 209.7 | 1,430 |
| WLBF | Kansas City, Mo., Thirty-second and Main Streets. | Everett L. Dillard | 50 | 209.7 | 1,430 |
| WLBG | Petersburg, Va., 126A North Sycamore Street. | Robert A. Gamble | 100 | 214.2 | 1,400 |
| WLBH | Farmingdale, N. Y., Conklin Street. | Joseph J. Lombardi | 30 | 232.4 | 1,290 |
| WLBI | East Wenona, Ill., 107 South Chestnut Street. | Wenona Legion Broadcasters (Inc.). | 250 | 238.0 | 1,260 |
| WLBL | Stevens Point, Wis., Hotel Whiting. | Wisconsin Department of Markets. | [2] 1,000 / [3] 2,000 | 333.1 | 900 |
| WLBM | Boston, Mass., 353 Washington Street. | Browning Drake Corporation | 50 | 230.6 | 1,300 |
| WLBN | Chicago, Ill. (portable, La Prairie, Ill.). | William E. Hiler | 50 | 204.0 | 1,470 |
| WLBO | Galesburg, Ill., 526 Monmouth Boulevard. | Frederick A. Trebbe, jr. | 100 | 217.3 | 1,380 |
| WLBQ | Atwood, Ill. | E. Dale Trout | 25 | 218.8 | 1,370 |
| WLBR | Belvidere, Ill. | Alford Radio Co. | 15 | 322.4 | 930 |
| WLBT | Crown Point, Ind., 317 East North Street. | Harold Wendell | 50 | 247.8 | 1,210 |
| WLBV | Mansfield, Ohio, Third and Diamond Streets. | Mansfield Broadcasting Association | 50 | 206.8 | 1,450 |
| WLBW | Oil City, Pa., 1 Sycamore Street. | Petroleum Telephone Co. | 500 | 293.9 | 1,020 |
| WLBX | Long Island City, N. Y., 283 Crescent Street. | John N. Brahy | 250 | 204.0 | 1,470 |
| WLBY | Iron Mountain, Mich., 1286 Carpenter Street. | Aimone Electric | 50 | 209.7 | 1,430 |
| WLBZ | Dover-Foxcroft, Me. | Thompson L. Guernsey | 250 | 208.2 | 1,440 |
| WLCI | Ithaca, N. Y. | Lutheran Association of Ithaca, N. Y. | 50 | 247.8 | 1,210 |
| WLEX | Lexington, Mass., Adams Street | The Lexington Air Station | 50 | 215.7 | 1,390 |
| WLIB | Elgin, Ill. (near) | Liberty Weekly (Inc.) and the Tribune Co. | 15,000 | 416.4 | 720 |
| WLIT | Philadelphia, Pa., Eighth and Market Streets. | Lit Bros. | 500 | 405.2 | 740 |
| WLOE | Chelsea, Mass., 56 Washington Avenue. | William S. Pote | 100 | 211.1 | 1,420 |
| WLS | Crete, Ill. (Hotel Sherman, Chicago, Ill.). | Sears, Roebuck & Co. | 5,000 | 344.6 | 870 |
| WLSI | Cranston, R. I. (335 Westminster Street, Providence, R. I.). | Lincoln Studios (Inc.) and Dutee W. Flint. | 250 | 260.7 | 1,150 |
| WLTH | Brooklyn, N. Y., 635 Fulton Street. | Voice of Brooklyn (Inc.) | 250 | 256.3 | 1,170 |
| WLTS | Chicago, Ill. | Lane Technical High School | 100 | 483.6 | 620 |
| WLW | Harrison, Ohio, 3401 Colerain Avenue. | Crosley Radio Corporation | 5,000 | 428.3 | 700 |
| WLWL | Kearny, N. J. (415 West Fifty-ninth Street, New York, N. Y.). | Missionary Society of St. Paul the Apostle. | 5,000 | 370.2 | 810 |
| WMAC | Cazenovia, N. Y., Fernwood Street | Clive B. Meredith | 500 | 225.4 | 1,330 |
| WMAF | Dartmouth, Mass. | Round Hills Radio Corporation | 500 | 428.3 | 700 |
| WMAK | Tonawanda, N. Y. | WMAK Broadcast Station | 750 | 545.1 | 550 |
| WMAL | Washington, D. C., 720 Eleventh Street. | M. A. Leese Co. | 500 | 241.8 | 1,240 |
| WMAN | Columbus, Ohio, 583 East Broad Street. | W. E. Heskett | 50 | 234.2 | 1,280 |
| WMAQ | Chicago, Ill. | Chicago Daily News Co. | 1,000 | 447.5 | 670 |
| WMAY | St. Louis, Mo. | Kingshighway Presbyterian Church. | 100 | 234.2 | 1,280 |
| WMAZ | Macon, Ga. | Mercer University | 500 | 270.1 | 1,110 |
| WMBA | Newport, R. I. (portable), 13 Robinson Street. | Le Roy J. Beebe | 100 | 204.0 | 1,470 |
| WMBB | Homewood, Ill., (near) | American Bond & Mortgage Co. | 5,000 | 252.0 | 1,190 |
| WMBC | Detroit, Mich., Hotel Savoy | Michigan Broadcasting Co. | 100 | 243.8 | 1,230 |
| WMBD | Peoria Heights, Ill., 107 East Glen Avenue. | Peoria Heights Radio Laboratory. | 250 | 205.4 | 1,460 |
| WMBE | St. Paul, Minn., 2018 Grand Avenue. | C. S. Stevens | 10 | 208.2 | 1,440 |
| WMBF | Miami Beach, Fla. | Fleetwood Hotel Corporation | 500 | 384.4 | 780 |

[2] Night. [3] Day.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WMBG | Richmond, Va., 914 West Broad Street. | Havens & Martin | 15 | 220.4 | 1,360 |
| WMBH | Joplin, Mo. | Edwin D. Aber | 100 | 294.0 | 1,470 |
| WMBI | Chicago, Ill., 153 Institute Place. | Moody Bible, Institute of | 2,500 | 263.0 | 1,140 |
| WMBJ | Monessen, Pa. | Star Theatre (William R. McShaffrey). | 50 | 232.4 | 1,290 |
| WMBL | Lakeland, Fla., 121 North Kentucky Avenue. | Benford Radio Studios | 100 | 228.9 | 1,310 |
| WMBM | Memphis, Tenn. | Seventh Day Adventist Church | 10 | 209.7 | 1,430 |
| WMBO | Auburn, N. Y., 95 Auburn Street. | Radio Service Laboratories | 100 | 220.4 | 1,360 |
| WMBQ | Brooklyn, N. Y., 95 Leonard Street. | Paul J. Gollhofer | 100 | 204.0 | 1,470 |
| WMBR | Tampa, Fla., 109 Franklin Street. | F. J. Reynolds | 100 | 252.0 | 1,190 |
| WMBS | Lemoyne, Pa., Fort Washington Road. | Macks Battery Service | 250 | 234.2 | 1,280 |
| WMBW | Youngstown, Ohio, 649½ Market Street. | Youngstown Broadcasting Co. | 50 | 214.2 | 1,400 |
| WMC | Memphis, Tenn. | Memphis Commercial Appeal | 500 | 516.9 | 580 |
| WMCA | Hoboken, N. J. (Hotel McAlpin, New York, N. Y.) | Hotel McAlpin (Greeley Square Hotel Co.). | 500 | 370.2 | 810 |
| WMCO | Saginaw, Mich. | Wolverine Broadcasting Co. | 250 | 272.6 | 1,100 |
| WMES | Boston, Mass., Barristers Hall. | Massachusetts Educational Society. | 50 | 211.1 | 1,420 |
| WMPC | Lapeer, Mich. | First Methodist Protestant Church. | 30 | 234.2 | 1,280 |
| WMRJ | Jamaica, N. Y., 10 New York Boulevard. | Peter J. Prinz | 10 | 206.8 | 1,450 |
| WMSG | New York, N. Y., 319 West West Forty-ninth Street. | Madison Square Garden Broadcast Corporation. | 500 | 236.1 | 1,270 |
| WNAC | Boston, Mass. | Shepard Stores | 500 | 461.3 | 650 |
| WNAD | Norman, Okla. | University of Oklahoma | 500 | 239.9 | 1,250 |
| WNAL | Omaha, Nebr., 5019 Capitol Avenue. | R. J. Rockwell | 250 | 258.5 | 1,160 |
| WNAT | Philadelphia, Pa., 827 Spring Garden Street. | Lennig Bros. Co. (Frederick Lennig). | 100 | 288.3 | 1,040 |
| WNAX | Yankton, S. Dak. | Dakota Radio Apparatus Co. and Gurney Seed & Nursery Co. | [1] 1,000 | 302.8 | 990 |
| WNBA | Forest Park, Ill., 810 Desplaines Avenue. | Michael T. Rafferty | 200 | 208.2 | 1,440 |
| WNBF | Endicott, N. Y., 117 West Main Street. | Howitt-Wood Radio Co. | 50 | 209.8 | 1,450 |
| WNBH | New Bedford, Mass., 725 Pleasant Street. | New Bedford Broadcasting Co. | 250 | 247.8 | 1,210 |
| WNBJ | Knoxville, Tenn. | Lonsdale Baptist Church | 50 | 206.8 | 1,450 |
| WNBO | Washington, Pa., South Main Street. | John B. Spriggs | 15 | 211.1 | 1,420 |
| WNBQ | Rochester, N. Y., 192 South Goodman Street. | Gordon P. Brown | 15 | 205.4 | 1,460 |
| WMBR | Memphis, Tenn., 883 Poplar Avenue. | Popular Radio Shop (John Ulrich) | 100 | 228.9 | 1,310 |
| WNBW | Carbondale, Pa., 21 Salem Avenue. | Home Cut Glass & China Co. | 5 | 199.9 | 1,500 |
| WNBX | Springfield, Vt. | First Congregational Church | 10 | 241.8 | 1,240 |
| WNBZ | Saranac Lake, N. Y., 107 Broadway. | Smith & Mace | 10 | 232.4 | 1,290 |
| WNJ | Newark, N. J., 89 Lehigh Avenue. | Herman Lubinsky | 250 | 267.7 | 1,120 |
| WNOX | Knoxville, Tenn., 313 Commerce Avenue. | Peoples Telephone & Telegraph Co. | 1,000 | 265.3 | 1,130 |
| WNRC | Greensboro, N. C., Jefferson Standard Building. | Wayne M. Nelson | 250 | 223.7 | 1,340 |
| WNYC | New York, N. Y. | City of New York (Department of Plant and Structures). | 500 | 526.0 | 570 |
| WOAI | San Antonio, Tex., Navarro and Oakland Streets. | Southern Equipment Co. | 5,000 | 499.7 | 600 |
| WOAN | Lawrenceburg, Tenn. | Church of the Nazarene and Vaughan School of Music. | 500 | 239.9 | 1,250 |
| WOAX | Trenton, N. J., 600 Ingham Avenue. | Franklyn, J. Wolff | 500 | 239.9 | 1,250 |
| WOBR | Shelby, Ohio (portable) | Harl Smith | 10 | 204.0 | 1,470 |
| WOBT | Union City, Tenn., 114 South First Street. | Tittsworth's Radio & Music Shop | 15 | 205.4 | 1,460 |
| WOBU | Charleston, W. Va., 1023 Quarrier Street. | Charleston Radio Broadcasting Co. | 50 | 267.7 | 1,120 |
| WOC | Davenport, Iowa, 1002 Brady Street. | Palmer School of Chiropractic | 5,000 | 374.8 | 800 |
| WOCL | Jamestown, N. Y. | A. E. Newton | 25 | 223.7 | 1,340 |
| WODA | Paterson, N. J., 115 Ellison Street. | O'Dea Temple of Music (Richard E. O'Dea). | 1,000 | 293.9 | 1,020 |

[1] Day only.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WOI | Ames, Iowa | Iowa State College | [2] 2,500 [3] 5,000 | 265.3 | 1,130 |
| WOK [1] | Homewood, Ill. (32 West Randolph Street, Chicago, Ill.). | Trianon (Inc.) | 5,000 | 252.0 | 1,190 |
| WOKO | Peekskill, N. Y., 800 South Street. | Harold E. Smith | 250 | 215.7 | 1,390 |
| WOKT | Rochester, N. Y., 65 Broad Street. | Titus-Ets Corporation | 500 | 209.7 | 1,430 |
| WOMT | Manitowoc, Wis | Mikadow Theater (Francis M. Kadow). | 100 | 222.1 | 1,350 |
| WOO | Philadelphia, Pa., Thirteenth and Market Streets. | John Wanamaker | 500 | 348.6 | 860 |
| WOOD | Furnwood, Mich. (Grand Rapids, Mich.). | Walter B. Stiles, jr | 500 | 260.7 | 1,150 |
| WOQ | Kansas City, Mo | Unity School of Christianity | 500 | 340.7 | 880 |
| WOR | Kearny, N. J. (147 Market Street, Newark, N. J.). | L. Bamberger & Co | 3,500 | 422.3 | 710 |
| WORD | Batavia, Ill | Peoples Pulpit Association | 5,000 | 252.0 | 1,190 |
| WOS | Jefferson City, Mo | Missouri State Marketing Bureau | 500 | 422.3 | 710 |
| WOW | Omaha, Nebr | Woodmen of the World Life Insurance Association. | 1,000 | 508.2 | 590 |
| WOWO | Fort Wayne, Ind., 213 West Main Street. | Main Auto Supply Co | [2] 2,500 [3] 5,000 | 228.9 | 1,310 |
| WPAP | Cliffside, N. J | Palisades Amusement Park | 500 | 394.5 | 760 |
| WPCC | Chicago, Ill | North Shore Congregational Church. | 500 | 223.7 | 1,340 |
| WPCH | Hoboken, N. J | Concourse Radio Corporation | 500 | 325.9 | 920 |
| WPEP | Waukegan, Ill., 140 Hazel Court. | Maurice Mayer | 250 | 215.7 | 1,390 |
| WPG | Atlantic City, N. J | Municipality of Atlantic City | 5,000 | 272.6 | 1,100 |
| WPRC | Harrisburg, Pa., 1740 North Fifth Street. | Wilson Printing & Radio Co | 100 | 209.7 | 1,430 |
| WPSC | State College, Pa | Pennsylvania State College | 500 | 299.8 | 1,000 |
| WPSW | Philadelphia, Pa., 1533 Pine Street. | Philadelphia School of Wireless Telegraphy (J. C. Van Horn). | 50 | 206.8 | 1,450 |
| WPTF | Raleigh, N. C., 8 West Hargett Street. | Durham Life Insurance Co | 500 | 545.1 | 550 |
| WQAM | Miami, Fla., 42 Fourth Street NW. | Electrical Equipment Co | 750 | 384.4 | 780 |
| WQAN | Scranton, Pa | Scranton Times | 250 | 230.6 | 1,300 |
| WQAO | Cliffside, N. J. (New York, N. Y.). | Calvary Baptist Church | 500 | 394.5 | 760 |
| WQBA | Tampa, Fla | Amore College of the United States of America. | 250 | 288.0 | 1,260 |
| WQBC | Utica, Miss | I. R. Jones | 100 | 215.7 | 1,390 |
| WQBJ | Clarksburg, W. Va., Willow Beach Club. | John Raikes | 65 | 269.9 | 1,250 |
| WQBO | Gulfport, Miss | Gulf Coast Music Co | 15 | 229.1 | 1,350 |
| WQJ | Chicago, Ill., 4100 Fillmore Street. | Calumet Broadcasting Co | 500 | 447.5 | 670 |
| WRAF | Laporte, Ind., 719 Michigan Avenue. | The Radio Club (Inc.) | 100 | 208.2 | 1,440 |
| WRAH | Providence, R. I., 191 Alabama Avenue. | Stanley N. Read | 250 | 199.9 | 1,500 |
| WRAK | Escanaba, Mich., 1105 Ludington Street. | Economy Light Co | 50 | 282.8 | 1,060 |
| WRAM | Galesburg, Ill | Lombard College | 50 | 247.8 | 1,210 |
| WRAW | Reading, Pa., 460 Schuylkill Avenue. | Avenue Radio & Electric Shop (Horace D. Good). | 100 | 238.0 | 1,260 |
| WRAX | Philadelphia, Pa., 1608 West Alleghany Avenue. | Berachah Church (Inc.) | 250 | 212.6 | 1,410 |
| WRBC | Valparaiso, Ind | Immanuel Lutheran Church | 250 | 238.0 | 1,260 |
| WRC | Washington, D. C | Radio Corporation of America | 500 | 468.5 | 640 |
| WREC | Whitehaven, Tenn. (Peabody Hotel, Memphis). | WREC (Inc.) | 100 | 249.9 | 1,200 |
| WREN | Lawrence, Kans | Jenny Wren Co | 750 | 254.1 | 1,180 |
| WRES | Quincy, Mass., 795 Hancock Street. | Harry L. Sawyer | 50 | 217.3 | 1,380 |
| WRHF | Washington, D. C., Hotel Annapolis. | American Broadcasting Co | 150 | 322.4 | 930 |
| WRHM | Fridley (Minneapolis), Minn | Rosedale Hospital | 1,000 | 280.7 | 1,150 |
| WRK | Hamilton, Ohio, 3 Railroad Street. | S. W. Doron & John C. Slade | 100 | 205.4 | 1,460 |
| WRM | Urbana, Ill | University of Illinois | [2] 500 [3] 1,000 | 272.6 | 1,100 |
| WRMU | MU-1 (yacht), 113 West Fifty-seventh Street. | Atlantic Broadcasting Co | 100 | 201.2 | 1,490 |
| WRNY | Coytesville, N. J. (Roosevelt Hotel, N. Y.). | Experimenter Publishing Co | 500 | 325.9 | 920 |
| WRPI | Terre Haute, Ind | Rose Polytechnic Institute | 100 | 208.2 | 1,440 |
| WRR | Dallas, Tex., Jefferson Hotel | City of Dallas | 500 | 461.3 | 650 |

[2] Night. [3] Day. [1] Operates through WMBB.

*List of broadcasting stations, alphabetically by call signal*—Continued

| Call signal | Location of station | Owner of station | Power (watts) | Wave length | Frequency (kilocycles) |
|---|---|---|---|---|---|
| WRRS | Racine, Wis., Arcade Building | Racine Broadcasting Corporation | 50 | 247.8 | 1,210 |
| WRST | Bay Shore, N. Y., 76 Main Street. | Radiotel Manufacturing Co | 250 | 211.1 | 1,420 |
| WRUF | Gainesville, Fla | University of Florida | 5,000 | 202.6 | 1,480 |
| WRVA | Richmond, Va., Twenty-second and Cary Streets. | Larus & Bro. Co | 1,000 | 254.1 | 1,180 |
| WSAI | Mason, Ohio | United States Playing Card Co | 5,000 | 361.2 | 830 |
| WSAJ | Grove City, Pa | Grove City College | 250 | 223.7 | 1,340 |
| WSAN | Allentown, Pa | Allentown Call Publishing Co | 100 | 222.1 | 1,350 |
| WSAR | Fall River, Mass | Doughty & Welch Electrical Co | 250 | 212.6 | 1,410 |
| WSAX | Chicago, Ill., 3620 Iron Street | Zenith Radio Corporation | 100 | 204.0 | 1,470 |
| WSAZ | Huntington, W. Va., 1143 Fourth Avenue. | McKellar Electric Co | 100 | 249.9 | 1,200 |
| WSB | Atlanta, Ga | Atlanta Journal | 1,000 | 275.9 | 630 |
| WSBC | Chicago, Ill., 1219 S. Wabash Avenue. | World Battery Co | 500 | 232.4 | 1,290 |
| WSBF | St. Louis, Mo., Sixth and Washington Streets. | Mississippi Valley Broadcasting Co. | 250 | 258.5 | 1,160 |
| WSBT | South Bend, Ind | South Bend Tribune | 500 | 399.8 | 750 |
| WSDA | Brooklyn, N. Y | The City Temple & Amateur Radio Specialty Co. | 500 | 227.1 | 1,320 |
| WSEA | Virginia Beach, Va., Cavalier Hotel. | Virginia Beach Broadcasting Co | 500 | 263.0 | 1,140 |
| WSGH | Brooklyn, N. Y., Brighton Beach. | The City Temple & Amateur Radio Specialty Co. | 500 | 227.1 | 1,320 |
| WSIX | Springfield, Tenn | 638 Tire & Vulcanizing Co | 150 | 249.9 | 1,200 |
| WSKC | Bay City, Mich | World's Star Knitting Co | 250 | 272.6 | 1,100 |
| WSM | Nashville, Tenn | National Life & Accident Insurance Co. | 5,000 | 336.9 | 890 |
| WSMB | New Orleans, La., Building Maison Blanche. | Saenger Theatres (Inc.) and Maison Blanche Co. | 750 | 296.9 | 1,010 |
| WSMK | Dayton, Ohio, Hotel Gibbons | Stanley M. Krohn, jr | 200 | 296.9 | 1,010 |
| WSPD | Toledo, Ohio, Hotel Waldorf | Toledo Broadcasting Co | 250 | 239.9 | 1,250 |
| WSRO | Middletown, Ohio | Harry W. Fahrlander | 100 | 236.1 | 1,270 |
| WSSH | Boston, Mass | Tremont Temple Baptist Church | 100 | 288.3 | 1,040 |
| WSUF | Suffolk, Va. (519 West Twenty-first Street, Norfolk, Va.). | Reliance Electric Co | 500 | 236.1 | 1,270 |
| WSUI | Iowa City, Iowa | State University of Iowa | 500 | 475.9 | 630 |
| WSUN | St. Petersburg, Fla | Clearwater Chamber of Commerce and St. Petersburg Chamber of Commerce. | 750 | 516.9 | 580 |
| WSVS | Buffalo, N. Y., 666 East Delavan Avenue. | Seneca Vocational School | 50 | 204.0 | 1,470 |
| WSYR | Syracuse, N. Y., Hotel Syracuse. | Clive B. Meredith | 500 | 225.4 | 1,330 |
| WTAD | Quincy, Ill | Illinois Stock Medicine Broadcasting Corporation. | [1] 250 / [2] 500 | 236.1 | 1,270 |
| WTAG | Worcester, Mass | Worcester Telegram Publishing Co. | 250 | 516.9 | 580 |
| WTAM | Cleveland, Ohio | Willard Storage Battery Co | [1] 3,500 / [2] 5,000 | 399.8 | 750 |
| WTAQ | Eau Claire, Wis. (Gillette Rubber Co.). | C. S. Van Gorden | 500 | 254.1 | 1,180 |
| WTAR | Norfolk, Va., 519 West Twenty-first Street. | Reliance Electric Co | 500 | 236.1 | 1,270 |
| WTAS | Villa Olivia, Hanover Township, Ill. (near Elgin). | Illinois Broadcasting Corporation | 500 | 275.1 | 1,090 |
| WTAW | College Station, Tex | Agricultural and Mechanical College of Texas. | 500 | 483.6 | 620 |
| WTAX | Streator, Ill., 115 South Vermillion Street. | Williams Hardware Co | 50 | 247.8 | 1,210 |
| WTAZ | Richmond, Va | W. Reynolds, jr., and Thomas J. McGuire. | 15 | 220.4 | 1,360 |
| WTFF | Mount Vernon Hills, Va | Independent Publishing Co | 10,000 | 202.6 | 1,480 |
| WTFI | Toccoa, Ga | Toccoa Falls Institute | 250 | 209.7 | 1,430 |
| WTHS | Atlanta, Ga | Atlanta Technological High School. | 200 | 227.1 | 1,320 |
| WTIC | Hartford, Conn | Travelers Insurance Co | 500 | 535.4 | 560 |
| WTMJ | Brookfield, Wis | Milwaukee, Journal | 1,000 | 293.9 | 1,020 |
| WTRL | Midland Park, N. J., 28 Sicomac Avenue. | Technical Radio Laboratory (H. C. Hogencamp). | 15 | 206.8 | 1,450 |
| WWAE | Chicago, Ill., 2024 Wabash Avenue. | Dr. George F. Courrier | 500 | 227.1 | 1,320 |
| WWJ | Detroit, Mich | Detroit News | 1,000 | 352.7 | 850 |
| WWL | New Orleans, La | Loyola University | 500 | 245.8 | 1,220 |
| WWNC | Asheville, N. C | Chamber of Commerce | 1,000 | 296.9 | 1,010 |
| WWRL | Woodside, N. Y., 4130 Fifty-eighth Street. | William H. Reuman | 100 | 199.9 | 1,500 |
| WWVA | Wheeling, W. Va., National Road. | John C. Stroebel, jr | 250 | 516.9 | 580 |

[1] Night. [2] Day.

### INTERNATIONAL COMPARISON OF FREQUENCY STANDARDS

The increase in power of many United States and foreign radio stations, making them international in their effects, has raised the question as to whether or not the national standards of radio-frequency of the various governments are in agreement. Since 1924 the Bureau of Standards has made several comparisons of frequency standards with the national laboratories of England, France, Italy, Germany, Canada, and Japan. These showed satisfactory agreement to the accuracy then required.

During the past year, however, it has become important to know much more accurately the agreement of the standards of the different nations. The development of the temperature-controlled piezooscillator offered a means of attaining this. Accordingly, during the summer of 1927 Dr. J. H. Dellinger, chief of the radio section, took to Europe such a piezooscillator containing two quartz plates which were carefully calibrated according to the United States standards. The piezooscillator was so constructed that the conditions of operation (tube voltages, temperature, etc.) could be very accurately reporduced at any place. Measurements were made on these piezooscillators at the National Physical Laboratory, England; Laboratoire of the Telegraphie Militaire, France; Italian Naval Laboratory, Italy; and the Physikalisch-Technische Reichsanstalt, Germany, where the national standards of the respective countries are maintained.

The difference between the measurements made at the various laboratories were very small, the average departures from the mean being 3 parts in 100,000. This agreement is surprisingly good. It represents an average difference of only 0.03 kilocycle at 1,000 kilocycles (300 meters). This is much smaller, for instance, than the variation, 0.5 kilocycle, allowed broadcasting stations in this country. In other words, as far as the United States and the larger European countries are concerned, the national standards of frequency agree sufficiently well to insure against interference provided the transmitting stations are accurately adjusted according to their national standards.

### STANDARD FREQUENCY STATIONS

For several years the Bureau of Standards has made measurements upon the transmitted waves of a limited number of radio-transmitting stations. Those which were found to hold their frequencies with great accuracy were included in a list published monthly in the Radio Service Bulletin. The demands on the bureau for testing and other urgent work require all the time of the bureau's limited radio staff; measurements on the standard frequency stations have consequently been discontinued.

### CONSTANT FREQUENCY STATIONS

The transmitted waves from these stations should be of value to the public as frequency standards because of their constancy and close adherence to their licensed values. The Bureau of Standards makes occasional measurements of the frequencies of some of these stations. Each station employs a special device for controlling or checking the frequency, the calibration of the device having been found by test to be in agreement with the bureau's frequency standards. The most satisfactory special devices are automatic piezocontrol, piezooscillator, or piezoresonator.

| Station | Owner | Location | Frequency |
|---|---|---|---|
| | | | *Kilocycles* |
| WTIC | Travelers Insurance Co | Hartford, Conn | 560 |
| WTAG | Worcester Telegram Publishing Co | Worcester, Mass | 580 |
| WOW | Woodmen of the World Life Insurance Association | Omaha, Nebr | 590 |
| WEAF | National Broadcasting Co | New York, N. Y | 610 |
| WRC | Radio Corporation of America | Washington, D. C | 640 |
| WMAQ | Chicago Daily News Co | Chicago, Ill | 670 |
| WCCO | Washburn-Crosby Co | St. Paul-Minneapolis, Minn | 740 |
| WTAM<br>WEAR | Willard Storage Battery Co | Cleveland, Ohio | 750 |
| WBBM | Atlass Investment Co | Chicago, Ill | 770 |
| KGO | General Electric Co | Oakland, Calif | 780 |
| KTHS | Arlington Hotel Co | Hot Springs, Ark | 780 |
| WGY | General Electric Co | Schenectady, N. Y | 790 |
| WOC | Palmer School of Chiropractic | Davenport, Iowa | 800 |
| WJJD | Loyal Order of Moose | Mooseheart, Ill | 820 |
| WLS | Sears, Roebuck & Co | Crete, Ill | 870 |
| WBZ | Westinghouse Electric & Manufacturing Co | Springfield, Mass | 900 |
| KOA | General Electric Co | Denver, Colo | 920 |
| KDKA | Westinghouse Electric & Manufacturing Co | East Pittsburgh, Pa | 950 |
| WBAL | Consolidated Gas, Electric Light & Power Co | Glen Morris (Baltimore), Md | 1,050 |
| WEAO | Ohio State University | Columbus, Ohio | 1,060 |
| WBAA | Purdue University | West Lafayette, Ind | 1,100 |
| KFIZ | Fond du Lac Commonwealth Reporter | Fond du Lac, Wis | 1,120 |
| WHK | Radio Air Service Corporation | Cleveland, Ohio | 1,130 |
| WMBI | Moody Bible Institute of Chicago | Chicago, Ill | 1,140 |
| KTNT | Tangley Co | Muscatine, Iowa | 1,170 |
| WEBJ | Third Avenue Railway Co | New York, N. Y | 1,170 |
| KWUC | Western Union College | Le Mars, Iowa | 1,230 |
| WJAY | Cleveland Radio Broadcasting Corporation | Cleveland, Ohio | 1,320 |
| KFVB | Hirsch Battery & Radio Co | Cape Girardeau, Mo | 1,340 |

## TESTING AND ADJUSTING PIEZOOSCILLATORS

By order of the Federal Radio Commission, broadcast stations are required to maintain their frequency within 500 cycles (0.5 kilocycle) of their assigned value. To maintain this accuracy of adjustment it is necessary to have special apparatus for checking the frequency of the transmitting set. The only satisfactory devices at present available for this are piezooscillators, piezoresonators, and automatic piezocontrol. A piezooscillator using a quartz plate is a very satisfactory device and can be purchased commercially. Specifications for a portable piezooscillator are given in Bureau of Standards Letter Circular 186. The piezooscillator described in these specifications does not provide for maintaining the quartz plate at constant temperature, which is desirable for the highest accuracy. These specifications do not include directions for cutting and grinding the quartz plate. A suitable plate can be obtained commercially. Letter Circular 223 describes the use of piezooscillators in radio-broadcasting stations. (Copies of these letter circulars may be obtained by persons having actual use for them, by addressing the Bureau of Standards, Washington, D. C.)

When a piezooscillator used as a standard to aid in maintaining the frequency of a station is tested by the Bureau of Standards, there are certain conditions which must be fulfilled. The Bureau of Standards will undertake a test of a piezooscillator only upon written request of the owner or operator of the transmitting station in which the piezooscillator is to be used. This request must contain the following information: (*a*) Name of the owner of the station where the piezooscillator is to be used, (*b*) location and call letters of the station, (*c*) licensed frequency of the station, and (*d*) type of piezooscillator and quartz plate used.

There is just at present an exceptional demand for radio tests of this kind which is greatly in excess of the capacity of the bureau for immediate service. For this reason it has been necessary to schedule pending tests and to notify each applicant for test of the approximate date the test will be made. Tests already scheduled will require about two months to complete. Every effort is being made to give much quicker service, consistent with accuracy, after that time.

Assignment of a date for test will be made only upon receipt of the written request from the owner or operator of the station giving the required information. The apparatus may be shipped at the time the test is requested or later in time to reach the bureau a few days before the assigned date. The test requires not

less than two days to complete. It is necessary that the entire piezooscillator except tubes and batteries be sent to the bureau. The type of tubes and the voltages should be specified in the letter requesting test.

The quartz plate must have a frequency not more than 1 per cent below the licensed frequency. If it has a frequency higher than the licensed frequency, it can not be adjusted by grinding. The fee for adjustment of quartz plates with mechanical means for adjustment is $12. The fee for quartz plates which are not provided with a mechanical means for adjustment and which must therefore be adjusted by grinding is $20. In case it is desired to maintain the quartz plate at a constant controlled temperature higher than room temperature, the work involved in the test is much greater. The fees for such tests are $25 and $50, depending on the type of adjustment required.

## REFERENCES TO CURRENT RADIO LITERATURE

This is a monthly list of references prepared by the radio laboratory of the Bureau of Standards and is intended to cover the more important papers of interest to professional radio engineers which have recently appeared in periodicals, books, etc. The number at the left of each reference classifies the reference by subject, in accordance with the scheme presented in A Decimal Classification of Radio Subjects—An Extension of the Dewey System, Bureau of Standards Circular No. 138, a copy of which may be obtained for 10 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. The various articles listed below are not obtainable from the Bureau of Standards. The various periodicals can be consulted at large public libraries.

### R000.—*Radio communication*

R007.9 Warner, K. B. The amateur and the International Radiotelegraph Conference. QST, **12**, pp. 15-22; January, 1928.
Results of the International Radiotelegraph Conference from the amateur viewpoint.

R020 Banneitz, F. Taschenbuch der drahtlose Telegraphie und Telephonie (book) (Pocketbook of wireless telegraphy and telephony). Published by J. Springer, Berlin, 1927.
Complete up-to-date compendium of radiotelegraphy and telephony written by a number of German experts.

### R100.—*Radio principles*

R113 Lardry, M. Suite dune etude sur la propagation des ondes courtes (continuation of investigation on propagation on short waves). L'Onde Electrique, **6**, pp. 465-81; October, 1927. Abstract in Experimental Wireless (London), p. 31; January, 1928.
Anomolies of propagation on 51 and 31 meters.

R113.1 Garrique, L. De l'onde hertzienne et de sa propagation (hertzian wave and its propagation). QST Francais et Radioelectricite Reunis, **8**, pp. 53-56; December, 1927.
Discussion of superiority of short over long waves and comparison of fading on these waves.

R113.2 Pickard G. W. The relation of radio reception to sunspot position and area. Proc. Inst. Radio Engrs., **15**, pp. 1004-1012; December, 1927.
Correlation of fading measurements to sunspot variations.

R113.4 Heising, R. A. Experiments and observations concerning the ionized regions of the atmosphere. Proc. Inst. Radio Engrs., **16**, pp. 75-99; January, 1928.
Determination of the height and variation in ionized regions of atmosphere.

R113.5 Bouthillon, L. Influence de la nature du sol sur l'émission et la réception radioélectrique (influence of the sun on radio transmission and reception). L'Onde Electrique, **6**, pp. 533-53; November, 1927.
Theoretical discussion of transmission phenomena and antenna systems giving method of measuring electromagnetic fields.

R113.5 Charman, F. Wave propagation and the weather. Experimental Wireless (London), **4**, pp. 735-42; December, 1927.
Tests conducted on 30 to 45 meters 2 hours after sunrise in England and correlation with meteorological phenomena.

R113.5 Wireless and meteorology (atmospherics used to trace progress of hurricanes in the West Indies). Wireless World and Radio Rev., **21**, pp. 813-16; December 21, 1927.
Work of U. S. S. *Kittery* recording atmospherics by means of direction finder and correlation with meteorological disturbances.

R113.6 Cartier, G. La radiophonie et les phénomènes de propagation (reflection, refraction, diffraction). QST Français et Radioélectricité Réunis, **8**, pp. 3-9; December, 1927.
Mathematical theory of transmission phenomena.

R113.8 Alway, E. J. Propagation of short waves during a solar eclipse. Proc. Inst. Radio Engrs., **15**, pp. 998-1001; December, 1927.
Observations on 30 to 45 meters during solar eclipse of June 29, 1927.

R114 Lee, A. G. Wireless Section—Chairman's address. Jnl. Inst. Elec. Engrs. (London), **66**, p. 12; December, 1927.

Important radio events in England from technical viewpoint—atmospherics, receivers, directive reception with wave antenna, and wavenna arrays.

R114 Cairns, J. E. I. Atmospherics at Waterloo, Western Australia. Proc. Inst. Radio Engrs., **15**, pp. 985-97; December, 1927.

Observations on wave form of atmospherics.

R125.6 Meissner, A. Raumstrahlung von Horizontal Antennen (space radiation of horizontal antennas). Elektrot-Nachrichten Technik, **4**, pp. 482-86; November, 1927.

Fields received at different distances—Data on 2 stations on 11 and 15 meters.

R125.6 Marconi, G. Radio communication. Proc. Inst. Radio Engrs., **16**, pp. 40-69; January, 1928.

Résumé of investigations on short waves and applications to beam transmission.

R130 Jobst, G. Drei Beiträge über Schwingungserzeugung (three contributions on production of oscillations). Telefunken Zeitung, **11**, pp. 11-38; October, 1927.

Theory of production of oscillations in electron tubes.

R145.3 Bashenoff, V. J. Abbreviated method for calculating the inductance of irregular plane polygons of round wire (part I of paper "On calculation of closed aerials.") Proc. Inst. Radio Engrs., **15**, p. 1013-; December, 1927.

Application to coil antennas.

R170 Klimke, S. Die Störung des elektromagnetischen Feldes eines Senders durch Gebäude und ähnliches (disturbances of electric fields of a transmitter through buildings and smiilar things). Elektrot-Nachrichten Technik, **4**, pp. 458-82; November, 1927.

Location and measurement of disturbances to reception.

### R200.—*Radio Measurements and standardization*

R210 Braillard, R., and Divoire, E. Die genaue Messung der Wellenlängen bei Sendestellen (exact measurement of wave length in sending stations). Elektrot-Nachrichten Technik, **4**, pp. 443-58; November, 1927.

Qualities of good transmitting set and good frequency meter—Method of measuring frequency.

R214 Jouaust, R. Le quartz piezo-électrique comme étalon de fréquence (piezoelectric quartz as standard of frequency). L'Onde Electrique, **6**, pp. 513-32; November, 1927.

Development and theory of piezooscillators; precautions when used as standard of frequency.

R214 Harrison, J. R. Piezoelectric resonance and oscillatory phenomena with flexural vibrations in quartz plates. Proc. Inst. Radio Engrs., **15**, pp. 1040-1054; December, 1927.

Experimental and mathematical discussion.

R250 Hazel, H. C. A new method for the calibration of ammeters at radio-frequencies. Proc. Inst. Radio Engrs., **16**, pp. 70-74; January, 1928.

Construction and operation of an electron tube designed for use in the measurement of radio-frequency currents.

R270 Barfield, R. H. The attenuation of wireless waves over land. Experimental Wireless (London), **4**, pp. 25-30; January, 1928. Also in Wireless World and Radio Review, **22**, pp. 2-6; January 4, 1928.

Intensity measurements with portable apparatus on transmissions of 2LO (London), giving map of distribution.

### R300.—*Radio apparatus and equipment*

R323 Le Marquand, H. Sous-marins et ondes Hertziennes (submarines and Hertzian waves). QST Français et Radioélectricite Réunis, **8**, pp. 40-42; December, 1927.

Description of apparatus used on submarines including experiments with different types of antennas.

R325.1 Keen, R. Wireless direction finding and directional reception (book, 2d ed.). Publishers, Iliffe & Sons (Ltd.), London, 1927. Price, 21 shillings. Abstract in Wireless World and Radio Review, **22**, p. 10, January 4, 1928.

Methods and apparatus used in direction finding.

R330 Forstmann and Schratum. Die Elektronenröhre (book). Publishers, Schmidt & Co., Berlin, 1927. Reviewed in Experimental Wireless (London), **4**, p. 760; December, 1927.

Treatise on electron tubes.

R331 Simon, H. Einiges über Empfangerröhren (something on receiving tubes). Telefunken Zeitung, **11**, pp. 38-50; October, 1927.

Construction and description of thoriated filament electron tubes.

R334 The Cossar screened valve. Wireless World and Radio Review, **21**, pp. 817-818; December 21, 1927.

Characteristic curves and practical hints for best conditions of operation.

R340 The power factor and capacity of the electrodes and base of triode valves, with special reference to their use in thermionic voltmeters. Experimental Wireless (London), **5**, p. 16; January, 1928.

Table giving capacity and power factor of several types of tube bases.

R341 Kuhlman, J. H., and Barton, J. P. The vacuum tube rectifier. Jnl. American Inst. Elec. Engrs., **47**, pp. 17–24; January, 1928.

Design of rectifier for use as B power supply; determination values of inductance and capacity for filter circuit—uses electron tube voltmeter.

R342.15 Müller and Von Ardenne. Transformatoren—Verstärker. (Transformers—amplifiers) (book). Publishers, Schmidt & Co., Berlin, 1927. Reviewed in Experimental Wireless (London), **4**, p. 760; December, 1927.

Treatise on radio transformers and amplifiers.

R342.6 Runge, W. Der abgestimmte Hochfrequenzverstärker (the tuned radio-frequency amplifiers). Telefunken Zeitung, **11**, pp. 56–63; October, 1927.

Theory of radio-frequency amplifiers with special reference to neutralization.

R360 Wheeler, H. A. Automatic volume control for radio receiving sets. Proc. Inst. Radio Engrs., **16**, pp. 30–39; January, 1928.

Uses rectified carrier voltage to adjust grid bias of radio-frequency amplifier tubes.

R376.3 Story of the horniess loud-speaker. Wireless World and Radio Review, **21**, pp. 806–10; December 21, 1927.

Historical Survey 1879 to 1927 of development of free-edge, fixed-edge, and inertia-controlled cone loud-speakers.

R384.1 Colebrook, F. M. Description of a valve wave meter with a range of 10 to 20,000 meters. Experimental Wireless (London), **4**, pp. 721–25; December, 1927.

Precision frequency meter independent of tube variations.

R384.1 Reed, M. The suppression of parasitic oscillations in valve circuits. Experimental Wireless (London), **4**, pp. 725–32; December, 1927.

Application to heterodyne frequency meter.

R384.1 Griffiths, W. H. F. Notes on the accuracy of variable air condensers for wave meters. Experimental Wireless (London), **4**, pp. 754–57; December, 1927.

Requirements for a condenser for use in precison frequency meter.

R385.5 Jakowleff, A. J. Die Berechnung der akustischer Eigenschaften des Kondensatormikrophons (calculation of the acoustical qualities of a condenser microphone). Zeitschrift für Hochfrequenztecknik, **30**, p. 151; November, 1927.

Theory and operation of the condenser microphone.

R400.—*Radio communication systems*

R412 Robinson, E. H. Some experiments with side band telephony on short waves. Experimental Wireless (London), **4**, pp. 715–21; December, 1927.

Advantages of side band transmission for frequencies above 1,500 kilocycles.

R431 Armstrong, E. H. Methods of reducing the effect of atmospheric disturbances. Proc. Inst. Radio Engrs, **16**, pp. 15–29; January, 1928.

Balanced receiving system using difference between amplitude of strays and signal.

R500.—*Applications of radio*

R533 Tätz, P. Signalübertragung auf fahrende Züge mittel Wechselstrominduktion und Resonanz (signal transmission to moving trains by means of a. c. induction and resonance). Telefunken Zeitung, **11**, pp. 70–78; October, 1927.

Description of apparatus used and experimental results.

R536 Eve, A. S., and Keys, D. A. Geophysical methods of prospecting. Bureau of Mines Technical Paper No. 420. Obtainable for 10 cents per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C.

A brief and elementary account of the principles involved including applications of radio. A short bibliography.

R582 Schriver, O. Über Verstärkung in der Bildtelegraphie (on amplifiers for picture telegraphy). Telefunken Zeitung, **11**, pp. 78–84; October, 1927.

Construction of amplifying apparatus.

R800.—*Nonradio subjects*

621.313.7 Copper oxide rectifier. Experimental Wireless (London), **5**, pp. 1–2; January, 1928.

Description and characteristic curve of rectifier.

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